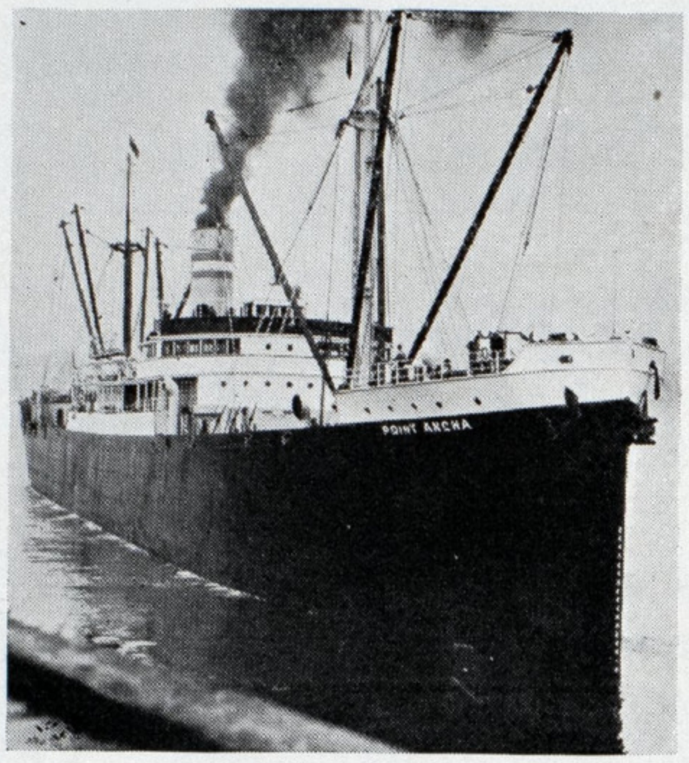
Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

The National Publication Covering the Business of Transportation by Water

CLEVELAND **FOUNDED 1878** **NEW YORK**



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Marine Review

FOUNDED 1878

SHIP OPERATION - SHIPBUILDING - CARGO HANDLING

Volume 63 **December, 1933** **Number 12**

Technical Contributions to The Shipping Industry

IF WE are to achieve success in maritime affairs we must appreciate the value not only of practical skill in building and operating ships, but also of the fundamental and underlying efforts of those who by research, investigation and analysis make possible more efficient design and operation of vessels and other appliances serving as the tools of shipping. In the papers presented at the recent annual meeting of the Society of Naval Architects and Marine Engineers in New York, there is ample evidence that much valuable work along this line is underway in the United States.

Several of the papers are of highly technical nature and at first glance seem rather remote in practical application. For instance the paper on theory of elasticity may not seem to be of any immediate practical use, but its value is apparent when we consider that by work of this kind it may be possible to save weight because of a more definte evaluation of stresses and strains. Others are directly applicable to design and operation, such for instance as the comprehensive and authoritative discusion of fire control for passenger vessels which represents the labor over years in studying the causes of fires and much experimentation in the development of materials and design for prevention.

Though the shipowner may differ with some of the conclusions advanced in the paper on cargo handling and stowage, he will be impelled to consider his own operations with a more critical attitude with the view of improvement. By thus stimulating active interest, much good will result.

The results published on the actual preformance of the MANHATTAN, during a year in service, will appeal directly to shipowners. That a great ship like the MANHATTAN, with an operating displacement of nearly 30,000 tons, can maintain throughout 13 round trips across the Atlantic, in a year's service, an average speed of well over 20 knots on an average fuel consumption of under 225 tons of oil fuel per 24 hours, is something of very definite interest to shipowners. The performance of this ship as given in the paper will receive the most careful study when specifications are under consideration for vessels in the same or similar services.

What power should be used for cargo ships in the light of present day technical development and experience? Should steam or diesel be used? There will be no universal agreement. But the shipowner will undoubtedly be led by the paper presented on this subject, to a more careful scrutiny of all the factors involved. He will not necessarily agree with the author's conclusions but he will want to establish the facts bearing on this problem.

The value of the work done at the United States experimental model basin can hardly be overestimated. By publishing the results of full scale trials on a destroyer, valuable knowledge has been developed in more accurately predicting, from model experiments, what the results for the full sized ship will be. Naval architecture is far from an exact science but the work done at the model basin throughout the years, beginning with the fundamental experiments carried on by Admiral Taylor, have done much to remove the uncertainty of arriving at desired results.

The knowledge of water conditioning of marine boilers has been measurably advanced by the paper on this subject and also by the discussions it provoked. An illustrated description of the launching of the NORMANDIE, the great French superliner, of 1027 feet in length overall with a total launching weight of 28,100 tons, is a contribution of outstanding interest to the profession of naval architecture. That this paper should be presented before the American society is still another indication that there are no national boundaries in the progress of science.

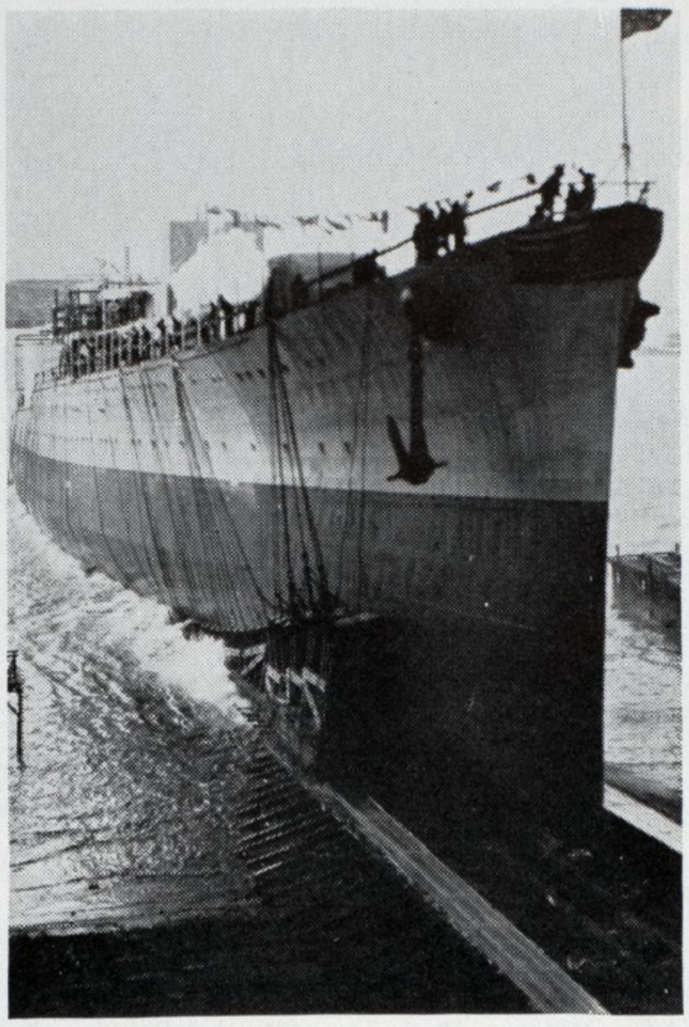
Launch Cruiser Tuscaloosa at Camden Shipyard

THE heavy cruiser TUSCALOOSA was successfully launched on the high tide at about 12 o'clock noon, Wednesday, Nov. 15, at the yard of the New York Shipbuilding Co., Camden, N. J. Mrs. T. L. McCann of Washington, had been designated by the United States navy department as sponsor for the vessel. Mrs. McCann was born and raised in Tuscaloosa and is the niece of Congressman William Bacon Oliver of Alabama.

This ship is the fifteenth of the United States navy's allotment of eighteen 10,000-ton cruisers of the eight-inch gun type allowed under the London naval treaty. Her construction was authorized by act of congress, Feb. 13, 1929 and the building contract was signed in March, 1931. Keel of the TUSCALOOSA was laid Sept. 3, 1931 and delivery will be made about May 1 of the coming year. As launched, the ship is approximately 75 per cent completed and when delivered will represent a cost of $10,500,000 exclusive of ordnance.

It will be remembered that the New York Shipbuilding Co. built the SALT LAKE CITY, the CHESTER and the INDIANAPOLIS which are respectively, the second, fourth and eleventh ships of this eighteen ship group.

The general characteristics of the TUSCALOOSA are as follows: Length overall, 588 feet; extreme breadth, 61 feet 9 inches; displacement 10,000 tons; mean draft, 21 feet 7 inches; designed horsepower, 107,000; personnel, 55 officers and 800 enlisted men; armament, nine 8-inch guns in three turrets, eight 5-inch antiaircraft guns in eight mounts; eight anti-aircraft machine guns; two 3-pounder saluting gune; two 1-pounder boat guns and one 75 millimeter landing gun.



Cruiser Tuscaloosa Launched, Nov. 15

Immediately after the launching ceremonies, the launching party were the guests of the New York Shipbuilding Co. at luncheon served at the Penn Athletic club in Philadelphia.

Canal Traffic Improves

During the first 15 days of October, 1933, 217 commercial vessels and 4 small non-seagoing launches under 20 tons measurement transited the Panama canal. Tolls on the commercial vessels aggregated $949,974.99 and on the launches $43.95, or a total tolls collection of $950,974.94.

The daily average of commercial vessels was 14.47 and the daily average tolls collection was $63,-331.67, as compared with an average of 13.27 transits and $58,585.29 in tolls for the first 15 days of the previous month, and an average of 11.80 transits and $51,538.70 in tolls for the first 15 days of October, 1932.

Commercial traffic showed an increase of 18 transits and $71,195.67 in tolls (9.0 per cent and 8.1 per cent, respectively) in comparison with the first 15 days of the previous month, while in comparison with the first 15 days of October, 1932, it registered a gain of 40 transits and $176,894.47 in tolls (22.6 per cent and 22.9 per cent, respectively).

Clyde Mallory Lines Flag

A new house flag and stack marking have been adopted for all of the steamers operated in the former separate services of the Clyde and Mallory lines. The services are now combined and called the Clyde Mallory lines.

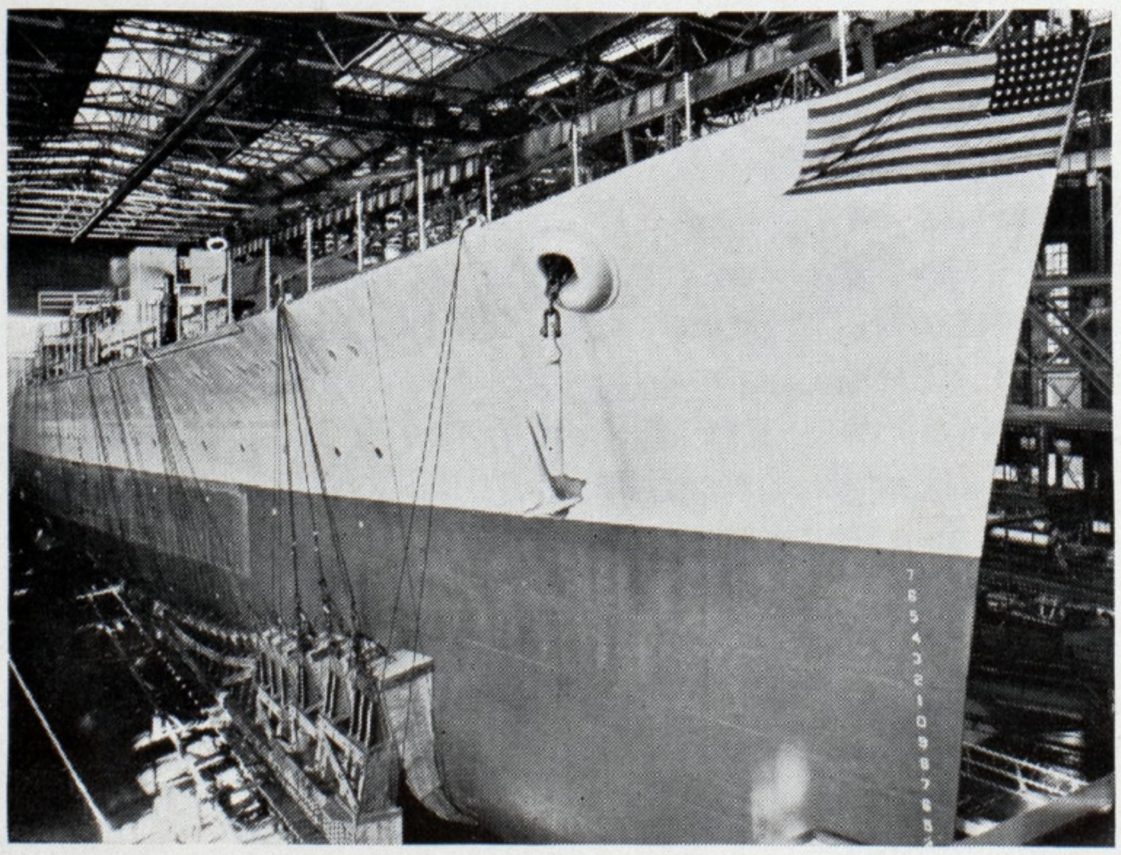
The new house flag will have the blue bars, top and bottom and white ground of the Clyde line's former flag, with a red star in the center. Stack markings will carry out the same scheme of colors as embodied in the house flag and this insignia is now being placed on all the company's steamers.

It will take the place of the plain black stacks of the old Clyde line and the black stack with a red star displayed by Mallory line ships since before the Civil war.

On Nov. 21 the United States submarine CUTTLEFISH was launched at the yard of the Electric Boat Co., Groton, Conn. The sponsor was Mrs. B. Saunders Bullard, wife of Lieut. Commander Bullard of the United States navy. Commander Bullard is supervising the construction of the vessel for the navy.

The CUTTLEFISH is a sistership of the CACHALOT, launched at the United States navy yard, Portsmouth, N. H., on Oct. 19.

Keel for the first of the two submarines awarded to the Electric Boat Co. on Aug. 3, was laid at the shipyard at Groton, Conn., on Oct. 24. The first submarine will be named the SHARK and the second and sister ship will be named the TARPON This is the first keel laid in the new naval shipbuilding program. Since Aug. 7 the working force at the shipyard has been increased from 35 to 40 per cent.



Heavy cruiser Tuscaloosa launched at the yard of the New York Shipbuilding Co., Camden, N. J., Nov. 15, 1933. *Sponsor, Mrs. T. L. McCann. The new vessel will be completed about May,* 1934

NAVAL ARCHITECTS

Hold Forty-first Annual Meeting

THE forty-first annual meeting of the Society of Naval Architects and Marine Engineers was held in New York on Nov. 16 and 17, with J. Howland Gardner, retiring president of the society, presiding. Mr. Gardner's three-year term in office will come to an end Dec. 31, 1933, and he will be succeeded as president of the society for the three-year term ending Dec. 31, 1936 by Rear Admiral George H. Rock, CC., U.S.N. (retired).

The technical sessions which opened 9:30 a.m. Thursday, Nov. 16 and continued throughout two days, were well attended. The papers presented and the discussions submitted were of the customary high standard. Abstracts of the papers are given in this article. As an indication of the world standing of the society, mention should be made of the paper on the launching of the NORMANDIE, presented in person by Monsieur See, chief engineer of the hull department of the Chantiers & Ateliers de St. Nazaire, builder of this superliner. Monsieur See made a special trip to the United States to present this valuable paper to the society, and it was received with the greatest interest and courtesy.

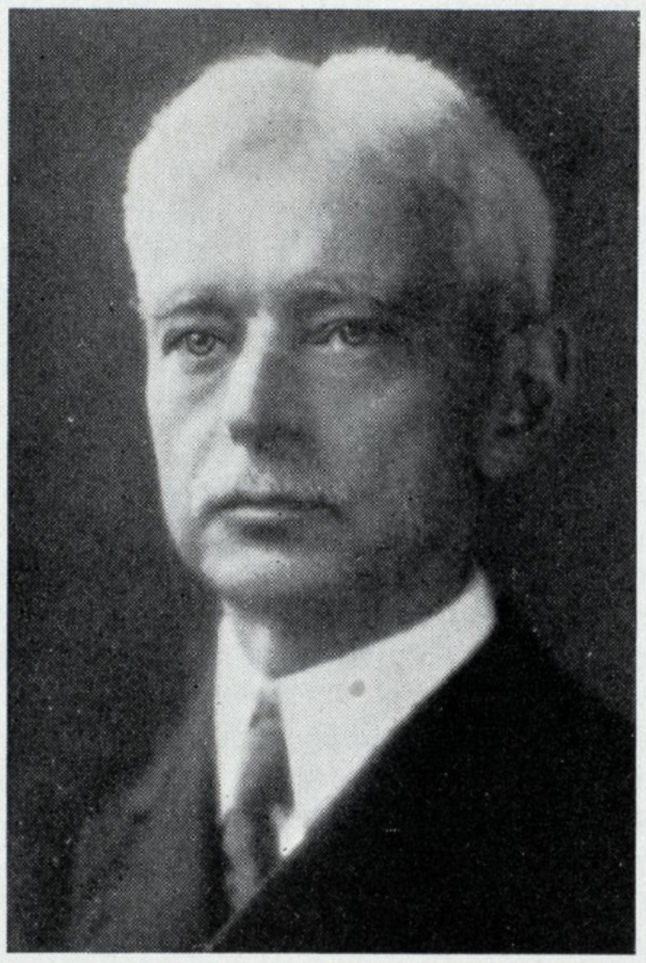
An abstract of the address by President J. Howland Gardner which was delivered at the annual banquet of the society held on the evening of Nov. 17 at the Commodore hotel, New York, follows:

Address by President Gardner

IT GIVES me great pleasure to welcome you to the forty-first annual meeting of our society. It is with regret that I announce through illness the inability of three distinguished and esteemed members to be with us. During the past forty years they have contributed most generously in building this society to its present important position. All three of them are past presidents and honorary members. I refer to Rear Admiral Washington L. Capps, CC., U.S.N. (retired); Rear Admiral David W. Taylor, CC., U.S.N. (retired).; and Capt. Walter M. McFarland, formerly of the United States navy, and president emeritus of Webb Institute of Naval Architecture.

Referring to the secretary-treasurer's report, the president called attention to the excellent financial condition of the society, and that the value of the securities held as of Nov. 1, had depreciated less than one-half of one per cent in value during the last year, and not one of the securities has defaulted in dividends. Though the membership is not equal to last year, it is in excess of 1929, at which time it stood at 1371. The membership as of Oct. 31, 1933 stands at 1526. He also referred to the publication last year by the society of a complete index of its transactions from 1893 to 1930, and that the yearbook which is published annually contains essential information concerning the current work of the society, as well as a cumulative index of the transactions since 1930. The publication has also been started of a pamphlet appearing from time to time containing general information of interest to members.

During the past year a closer contact has been established with other engineering societies. This has resulted in mutual benefit and the hope is expressed that it can be continued to the end that still closer relations may be maintained.



Rear Admiral G. H. Rock, (Ret.)
President-Elect of the Society of Naval Architects

Special Meetings Held

On Feb. 24, 1933 the society joined with the American Society of Mechanical Engineers in a meeting held on board the Italian liner, CONTE DI SAVOIA. On that occasion two papers were presented on gyro-stabilizers and after dinner the ship was open for inspection, including especially the stabilizing gyroscopes.

One of the outstanding events was the spring meeting held last May at the Commodore hotel, New York. At that meeting G. S. Baker, superintendent of the William Froude laboratory, Teddington, England, delivered two lectures covering some of the important work that has been carried out in this newly equipped model tank. These papers and the proceedings of the meeting will form a part of the published transactions for this year.

During June a joint meeting was held in Chicago with the American Society of Civil Engineers and the American Society of Mechanical Engineers. At that time papers were read covering a century of progress in the various branches of engineering.

In his address the president emphasized the great need of an up-to-date experimental model basin for investigating the complex problems that must be solved in the construction of both naval and merchant vessels. Attention is called to the fact that only last year the British government completed a new model tank 1678 feet in length. It is to be hoped that this country will soon have a new model tank in Washington in order that our navy and merchant marine may have the benefit of proper tools for carrying on experiments so essential if we are to compete with foreign countries in the quality of our naval and merchant vessels. The society has for sometime advocated the construction of a new model tank. At the last meeting the council passed a strong resolution for such a tank. This was followed by a letter urging the appropriation from the public works fund under the national recovery act. The action of the society is strongly supported by the navy department, the National Council of American Shipbuilders, the American Society of Mechanical Engineers, and by marine interests generally.

Progress in New Developments

Progress has been made during the year in developing fire resisting material for construction. Shipbuilders have given earnest attention to the substitution of metal in place of wood in superstructures and to the possibility of eliminating nitro-cellulose paints and varnishes.

Introduction of welding is moving forward rapidly with resulting substantial decrease in the weight of vessels. On account of its success the prophecy is made that with the continued advance in the art of welding, we will see a reduction in the use of riveted joints.

Anti-rolling devices are receiving

attention due to the performance of the CONTE DI SAVOIA, which is equipped with three antirolling gyroscopic stabilizers. A spade shaped, fin type, antirolling device brought out by the Japanese also appears to be worthy of investigation.

While the diesel engine is extensively used in the United States in vessels of small tonnage, it does not appear to be received in this country with the same enthusiasm for larger vessels, that it has met with abroad. Out of 44 ships under construction abroad at the beginning of 1933, varying in tonnage from 6000 to 30,000, thirty-eight are motor driven.

Use of turbine electric drive is exemplified in the French superliner NORMANDIE, now under construction, and reported to be the highest powered passenger vessel yet built. In the United States the delivery of the S. S. PETEN in February, 1933 marked the completion of a program of six combination passenger cargo vessels in which turbo-electric propulsion is used.

Foreign Trade Shows Increase

It is believed that our foreign trade has already reached its lowest point. There are indications of an upward trend. The months of July, August and September all showed increases over the corresponding period last year. It is estimated that the newly awakened Russian market can absorb from $3,000,000,000 to $5,000,000,000 of American goods within the next four or five years. If and when we have a real revival in foreign trade, it will certainly be accompanied by a demand for new, up-to-date vessels.

A sad outlook confronted us a year ago. The new merchant marine program was practically completed and we viewed with apprehension the slow disintigration of our shipbuilding industry. Without work our shipyards were facing the loss of technical and mechanical experts, men who are vitally important to the preservation of the industry and who had been developed in years of training.

How rapidly this situation changed. We are fortunate indeed that President Roosevelt knows from actual experience the needs of an adequate navy and merchant marine. He has shown great interest in our society and has contributed to our transactions. I had hoped that he would be with us this evening.

I am in receipt of a letter of regret. The members will please stand while I read this letter from the President of the United States:

November 13, 1933

The Whie House
Washington D. C.
My dear Mr. Gardner:

"It is with personal regret that I am compelled to decline your cordial invitation to attend the banquet of the Society of Naval Architects and Marine Engineers, on next Friday, since I am leaving on that date for a visit to Warm Springs.

"Your letter recalled to me some very vivid and pleasant recollections of the meeting in 1913, when I was assistant secretary of the navy.

"My interest in the service to which your society is dedicated dates a long way back, and I can assure you it remains undiminished.

"To make American ships the safest and the most efficient in the world, and thus help to win international markets for American industrial and farm products, is worthy of the highest efforts of your society."

"Sincerely yours,
Franklin D. Roosevelt"

Navy and Coast Guard Program

Under the new navy program contracts have been let for the construction of 21 naval vessels in private shipyards and 16 in government navy yards. These contracts call for the expenditure of $265,000,000 of which $130,000,000 is in privately owned yards. This work is scheduled for completion in 1936 and will give employment to 50,000 men extending over a period of three years. The navy yards and shipbuilding industry will expend for labor about $112,000,000 and approximately an equal amount will be expended by allied industries. It is estimated that labor in allied industries will reach its peak at or about next spring, and in the shipyards about a year from now. I understand there is a strong sentiment in Washington for further expansion to the end that this country may take its proper place with our naval strength 100 per cent.

In addition to the naval program there has already been appropriated over $25,000,000 for the coast guard, including airplanes and reconditioning and building of coast guard vessels.

Now that we have a ship-minded President, I hope that he, as well as the members of the society, can impress upon the public the necessity of continuity of naval construction to the end that our most highly trained scientists and artisans can have continuous employment, resulting not only in advancing the art and science of shipbuilding, but also in reducing the cost of construction. This can be brought about by a proper and logical naval replacement program.

The late Captain Mahan, laid down the important formula: Sea power is equal to bases plus navy plus merchant marine. The strength of a naval fleet depends upon a strong merchant marine from which to draw vessels as auxiliaries and for the transportation of supplies and personnel. One of the major requirements are tankers for the transportation of fuel and to act as fuel stations. It is apparent that the building of our navy must be followed by increased activity in the construction of merchant tonnage.

The Congressional Investigation

Thirty-two new passenger and combination vessels have been constructed under our merchant marine acts. These vessels are the equal in operating efficiency of those constructed anywhere in the world. They are designed for conversion to naval auxiliaries, if required. These vessels could not have been built without the aid of mail contracts and the society has consistently maintained that the mail contracts are an essential part of our present merchant marine and navy program.

We have heard a lot lately of the investigation of oversea mail contracts. The American merchant marine welcomes such an investigation. This investigation must be thorough and it must be complete, an earnest and definite effort to establish the main facts. We have no fears of such an investigation. Let it start out with a determined effort whether the United States requires or does not require a merchant marine. To those who are familiar with this subject such an inquiry will seem a waste of time. The people of this country should remember the past. They should look back over the few years that have gone and realize our position during the World war, when other nations told us what they would and would not carry of our goods. Without an American merchant marine, we will have absolutely no control over the rates that must be paid by our manufacturers and farmers for the transportation of their goods to the foreign markets when foreigners also control the vessel transportation.

Reference is made to our position when we had a great army and only a handful of ships to transport it; when our navy sailed around the world supported in the carriage of supplies, the lifeblood of our navy, by ships chartered from and by the grace of foreigners.

He suggests that the investigation should determine the cost of operating vessels under the American flag in competition with those of other nations. It will be found that all of the great maritime nations are lending aid to shipping; and also that due to the higher standards of living of our own people and the higher standards of wages, the cost of operation and the capital cost of construction are far in excess of other nations. These investigations will also develop the fact that our mail contracts impose obligations on the owners of American vessels subject to this act and that these obligations are particularly important not only in times of peace, but are essential to our navy in time of war. These obligations are cited briefly

as follows:

1. The ships are subject to commandeering by the United States government in the event of a national emergency.

2. They are required to have all licensed officers and two-thirds of the crew composed of American citizens.

3. These ships must be of such construction and have incorporated in them special features imposed by the navy in order that they may be readily converted into auxiliary naval vessels.

4. These passenger and combination vessels are fitted with transverse watertight bulkheads in excess of the international convention on safety of life at sea.

We welcome an investigation of mail contracts by congress, and we appreciate that the continuance of government support is dependent upon the proper administration of the law regarding such support. Further, we know that a complete investigation will not in any way affect the American policy prescribed in the merchant marine act of 1920 which states:

"That it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency. . . ."

In concluding his remarks, President Gardner said:

In accordance with our constitution my term of office is drawing to a close. These are the last meetings over which I will have the honor of presiding as your president. I cannot let the opportunity go by without expressing to you my deep appreciation of the spirit of cooperation that has prevailed during my tenure of office; the spirit of cooperation that has always marked the activities of this society and has made possible the progress in the ever advancing science and art of shipbuilding.

To this progress you by your interest in this society have largely contributed and it is an honor to have been associated with and held office in this splendid organization. If, as I am sure, you will continue in the same spirit that has dominated this society for over forty years you will continue to progress and by so doing will fulfill your duty not only to the society but to your country, and I wish the Society of Naval Architects and Marine Engineers a continuation of this ever-increasing success.

TWELVE papers were presented during the two days' meeting of the Society of Naval Architects and Marine Engineers, Nov. 16 and 17. These papers and all of the discussions will be published in full in Vol. 41 of the transactions of the society which should be ready for distribution sometime prior to June, 1934. Titles of the papers, names of the authors and brief abstracts follow:

1. Theory of Elasticity, Solution of Problems by Trial, by L. W. Ferris, visitor.

The author is attached to the bureau of construction and repair, navy department, Washington. In this paper it is pointed out that the theory of elasticity is a branch of the science of physics which deals with stresses and strains and that it is intimately related to the studies of light, sound, and the constitution of matter. It is suggested that it is possible for practical purposes to satisfy the conditions of elasticity by a trial and error procedure.

The author then develops the procedure which appears most practical for calculation by trial and outlines it as follows:

1. State the problem exactly, giving all conditions which must be satisfactory at the boundaries.

2. Assume a condition of strain for the whole area.

3. Calculate the stresses corresponding to the assumed strain.

4. Test the resulting state of stress for agreement with the boundary conditions and for satisfying the requirements of equilbrium.

5. Adjust the assumed strains as guided by the tests, calculate the stresses again, continue with the tests and adjustments until a close agreement is reached.

Steps are then outlined for a specific case including the calculation of stresses from assumed strains, and after having tabulated the calculated stresses for all chosen points, the tests for equilibrium are made.

In conclusion the author calls attention to the fact that while the design of a structure involves many difficulties other than the evaluation of stresses, the stress analysis is important and will be carried out with increasing thoroughness in the future. He suggests that all available means for investigating strength, both analytical and experimental, should be used as far as conditions permit in order to give a comparison of the results by different methods.

2. Some Notes on Defects and Fractures, by William Bennett, member.

The object of this paper, according to the author, who is a member of the staff of Lloyd's Register of Shipping in the United States, is to direct attention to some of the features of defects and fractures of steel and other materials sometimes met with in shipyards and engine shops. The point is made that a careful study of the appearance of a defect or fracture can frequently give important information as to the strength and ductility of the material; also, the cause may be more readily deduced if the particular kind of fracture can be established.

A number of interesting illustrations show different types of defects and fractures. Some of the more common defects found in steel are detailed, separated into two groups, those found (a) in the ingot, and (b) in the rolled material. In the ingot the most frequently found defects are: piping, blowholes, segregations, inclusions, blisters, and scabs; while in the rolled material, they are: seams, slivers, laminations, pits, laps, clinks, and snakes.

The author concludes by expressing the hope that these notes on defects and fractures, collected at random in the midst of other duties, may be of some interest to those less likely to experience them. He also suggests that many other interesting cases have undoubtedly come to the attention of members and that details of such cases should be offered to supplement the paper. In pointing out that fatigue fractures are not infrequently found at the corner of a keyway in the tailshaft, the author makes the specific recommendation that keyways should be cut with round fillets at the base and end.

3. Fire Control for Passenger Vessels, by George G. Sharp, member.

The comparative frequency in recent years of serious fires on modern ships makes this comprehensive survey, by a naval architect, who has given much study to the subject, of unusual value to the industry. The paper, which with the appendix is 48 pages in length, is profusely illustrated with photographs and diagrams.

The author considers it unfortunate that so much consideration given recently to the fire hazard on passenger ships has been in the light of the many spectacular fires of the last few years, because this is apt to lead to laying the emphasis too greatly upon providing the means for dealing with a conflagration. In the present paper the principal factors in the development of means for controlling fire, particularly in the accommodations of passenger vessels, are outlined. Existing practices are compared in order to see wherein they fail, and additional provisions are suggested whereby the desired end may be attained.

On the reasonable assumption that an outbreak of fire cannot be prevented, that 100 per cent protection is not an immediate possibility, and that fire will spread, due to the lapse of time between its detection and the funtioning of extinguishing systems, the author proposes that

consideration be given to the essential factors governing methods whereby fire might be controlled. The provisions for detection and extinction and for construction and draft, as briefly outlined below and fully discussed in this paper, if put into effect would make the control of fire possible. The provisions referred to are:

1. *Detection and extinguishing*: A reliable automatic alarm system with a detector in each cabin or other enclosure and registering in a central control station or pilot house. A 24-hour watch in the central control station whether the vessel is at sea, in port, or laid up. An adequate patrol of public rooms, corridors and spaces not served by the automatic alarm. Two powerful jets simultaneously directed at any part of the ship; also, an additional jet on the decks next above and below, together with statutory fire extinguishers.

2. *Construction and draft*: Confine fire within cabin or other enclosure bulkheads by use of such materials for construction as to insure maintenance of their integrity for a sufficient period of time (say 20 minutes) after the alarm registers in order to allow fire fighters to reach the fire location and to get extinguishing apparatus into operation.

Public and other spaces (without automatic detection) of such construction as to maintain their integrity after an outbreak of fire for the period between patrol rounds. Elimination of all draft to each cabin or other enclosures except such as might be created by open air ports, door or ventilation. Means for shutting down mechanical ventilation from the pilot house, or central control station, immediately upon receipt of alarm.

With the above as his thesis as a reasonable outline of the essential factors for the control for fire in the accommodations the author proceeds in this paper to examine existing regulations and conditions to determine wherein they fail to meet the provisions as outlined.

Some very interesting illustrations and descriptions are given in this paper on numerous tests of sample structures showing the fire resisting properties of various materials and methods of construction.

As an appendix the author has given the recommended regulations covering fire resisting construction aboard vessels (ocean and coastwise) which were adopted as a tentative standard at the annual meeting of the National Fire Protection association, May 29 to June 1, 1933 at Milwaukee, Wis. These regulations were prepared as the result of the work of the conference committee on construction of the marine committee which was headed by the author as chairman.

4. Effect of Form on Roll, by Lieut. M. E. Serat, CC., U. S. N., visitor.

The author is attached to the United States experimental model basin, Washington. This paper is based on tests made at the model basin. With all other factors remaining unchanged the following conclusions may be drawn:

1. When the center of gravity is lowered the energy damping is decreased.

2. When the period is increased, the energy damping is decreased.

3. When the height of the metacenter above the waterline is increased, the energy damping is increased.

4. When the midship section coefficient is increased, the energy damping is increased. When the midship section coefficient becomes greater than unity, the energy damping is greatly increased.

5. Since an increase of metacentric height decreases the angular damping and thereby entails greater angles of roll, the metacentric height should be no larger than is required by considerations of safety.

6. Although an increase of period entails a decrease damping, both energy and angular, a large period makes the occurrence of synchronism with waves less likely. Periods should be made as large as possible, without unduly infringing on other considerations.

7. It is believed that the amplitude of roll of a ship in synchronous waves can be closely predicted from the declining-angle curve of the model.

The experiments described in his paper were performed jointly by the author and J. G. Thews, junior physicist, at the United States experimental model basin.

5. Method for Estimating Ship Frictional Coefficients, by Rear Admiral D. W. Taylor, CC., U. S. N. (retired), past president.

This paper is printed in full on page 23.

6. Cargo Handling and Stowage, by H. E. Stocker, associate member.

An abstract of this paper is presented on page 18 of this issue.

7. Diesel versus Steam Drive for Cargo Ships, by Louis R. Ford, member.

With the force of logic the author calls attention to the inevitable time when new cargo ships must be built if we are to serve successfully our established trade routes. The major problem in this coming shipbuilding program is the selection of the right type of motive power, with the choice lying between steam and diesel machinery.

The normal and natural trend of marine power development in the United States, the author states, has been prevented by the abnormal conditions brought about by the great fleet of merchant vessels built during and shortly after the war. In other words, the great fleet of steamers left on our hands precluded such development. On the other hand, in all other countries the continued building of all types of ships led to trial, under peace time conditions, of all types of motive power.

In this country the only ship construction of major importance has been confined to rather large combination ships and there has been no opportunity to lead up to large diesel work by natural stages, nor for our diesel engine builders to acquire, in normal stages, experience in building large marine engines. The author suggests that our present position in regard to the use of the diesel engine might be different if our merchant marine represented a normal growth.

Diesel Development Impressive

He refers to the tremendous and universal development throughout the world outside of the United States, and to the fact that for a number of years the total tonnage of motorships under construction has exceeded that of steamers by an ever increasing per cent. At the time this is written, the total motorship tonnage actively under construction is three times that of the total steam tonnage, and the author suggests that this situation calls for serious study to prevent our anticipated new construction being anything but the best. He makes the point that whether such study results in our future cargo ships being steam fitted or diesel engine driven that we at least be sure that our choice is based on reasoned and rational analysis of all the factors involved. Because the United States has never yet been content to lag in the rear of any technical development, the maintenance of that record demands that we approach this question of type of power for our future ships not in the spirit of pro-diesel or pro-steam, but with the desire to determine the best type for each particular case.

In this paper which is 14 pages long, many features are considered. We should not attempt, the author believes, to apply the arbitrary rule that all ships should be diesel driven or all steam driven, but rather that for each particular ship or group of ships the trade route and the kind of trade engaged in should be analyzed to determine and evaluate the factors involved. He therefore develops a form of analysis that will have general application and offer means of determining what can reasonably be expected in the way of performance from a motorship or

steamer of given size. The variable factors can then be applied to indicate what the choice of the machinery may be.

Trial and Service Results

He first considers the stationary plant as a basis of reference from which to start a performance study. The heat consumption of a number of modern steamers from trial trip performance is given. Service performance is then differentiated from these trial results. In one instance the fuel consumption in service was found to be 15 to 18 per cent higher than the trial consumptions. Curves are plotted to show respectively the anticipated trial fuel consumption of marine steam turbines and the similar consumption in actual service. The actual service condition results are plotted with the names of the ships. At 30 knots the B.t.u. per hour per shaft horsepower for anticipated trial trip results is shown to be 10,000 whereas for similar service conditions at the same speed it is 11,500 while the heat consumption of diesel engines is shown to be a little over 7000 B.t.u., and it is represented by a horizontal line due to the same heat consumption regardless of the size of the diesel engine. Examples are quoted of diesel engine performances. On this basis translating heat consumption into fuel consumption the author states that there can be no question with the choice based on this factor alone.

He then discusses the cost of fuel and calls attention to the fact that posted prices of oil fuel in United States show a differential of considerably over 100 per cent in favor of boiler fuel in Atlantic and Gulf ports but that this price situation exists at very few oil ports throughout the rest of the world. At Los Angeles and San Pedro there is a difference of only 15 per cent per barrel in favor of boiler fuel. A table is given showing fuel costs if bunkered at New York. The example given is a 4000 horsepower steamer and 4000 horsepower motorship. The cost of fuel per hour for the steamer if bunkered at this port is $6.15 and for the motorship $7.92. On the other hand, if bunkered at San Pedro, the cost of fuel per hour for the steamer is $6.97, while for the motorship it is $4.80.

Using the data derived from the reference curves of consumption for steam and diesel, it is possible to determine the limiting price the motorship can pay for diesel fuel before its total fuel cost will exceed that of the steamer. The maximum the motorship can pay for fuel is $1.282 per barrel when the steamer pays $0.75. This works out so that the motorship can pay 85 per cent more for its fuel than does the steamer without its fuel bill exceeding that of the steamer. This relation will hold true, of course, in any part of the world.

Three questions are considered. First, is it necessary for the motorship to use this highest grade of fuel? Second, is it necessary for the ship that does use this highest grade fuel to pay the listed price for it? Third, why should a motorship operating out of Atlantic or Gulf coast ports take its fuel in these ports?

The question is also raised as to the necessity of paying the listed price for diesel fuel and an instance is given of bunkering a fleet of large diesel tugs in New York harbor at $1.15 to $1.20 per gallon for the oil that is currently quoted at $1.75 per barrel. Foreign owned transatlantic ships operating out of New York, the author states, avoid paying New York list prices for the best grade of diesel fuel by bunkering all their fuel in European ports at prices from $1.15 to $1.25 per barrel.

A table of low prices as posted for boiler fuel and diesel fuel is given in the paper. The question of fuel capacity is discussed with the conclusion that the motorship will have a much greater latitude as to choice of bunkering ports because of its much smaller fuel consumption.

Cost Somewhat Higher

With reference to the cost of machinery a specific instance is quoted of a recent estimate for a 10,000 ton ship of 4000 shaft horsepower in which the completed ship with steam turbine drive was quoted at $652,000 and with diesel drive at $685,000. This represents a greater cost for the diesel machinery of $33,000 or $8.25 per horsepower. It is pointed out that some estimators claim that this difference should be greater, in some cases placing it as high as $15. However, the price quoted by the machinery builder or shipyard on the owner's specifications are the only figures the latter is justified in using as an analysis,

It is suggested that under present conditions such prices are subject to wide variations according to the circumstances in each individual case. Whatever the excess of diesel cost over turbine cost, it results in an extra fixed charge to be added to the operating cost and is chargeable against the saving of fuel cost effected by the use of diesel machinery.

The question of weight of diesel machinery is discussed and it is pointed out that where there is no particular advantage in weight reduction, the diesel engine may be heavier, but if it is desired to reduce weight there are now diesel engines available that carry no weight penalty when compared with steam turbine equipment. The author refers to the machinery weights of the six steamers cited in a paper, presented before the society last year as having light weight equipment where the average specific net weight is 263 pounds per shaft horsepower. This is a weight that can be readily met by modern diesel machinery of the direct drive type, while with the use of moderately high speeds diesel engine and reduction gears, a specific weight of 180 pounds per shaft horsepower is quite practicable.

The cost of maintenance is such a highly variable matter and is affected by so many factors not directly related to type of machinery that the author feels it is useless to mention specific ships as indicated the superiority of one type over another. Given a well designed and well built steam plant and an equally well designed and well built diesel plant with equally good management in both cases there should be little or no difference in the maintenance.

Additional Factors in Choice

Additional factors affecting the choice of machinery are referred to, such as crew requirements, reliability, space for machinery, fresh water, and availability of fuel. The turbine driven oil fired steamer should not require a larger operating crew than the equivalent motorship, although in most cases it is found that one to three more men are used. As to reliability, the answer seems to be that the day in and day out performance of hundreds of vessels of both types is satisfactory to reasonable and unbiased engineers. In regard to space there are certain advantages in the use of diesel power for passenger ships, but in the type of vessel considered in this paper the difference in space required is not sufficient to give any outstanding advantages to diesel machinery.

The question of fresh water requirements, where analysis of other factors has shown a narrow margin in favor of diesel machinery, may have deciding weight. Make-up feed water is of great importance to the steamer; it is not needed for the motorship. Estimates vary from one to 10 per cent of the total of evaporation, and it is believed that the average actual requirement lies somewhere between these figures. In any event the steamer must have a considerable supply of fresh water. This requires either large storage capacity or the operation of a distilling plant. In the first case the deadweight capacity is reduced and in the second the fuel consumption is increased.

Availability of fuel is a factor of importance only on a few trade routes. Boiler fuel is available at most ports throughout the world and diesel fuel is almost equally well distributed. Availability, however, must be considered as a function of

price and the bearing of price on the general problem has already been discussed.

In conclusion the author states that it is evident that of all factors entering into the selection of cargo ship machinery, fuel consumption and fuel cost, are by far of the greatest importance. They may be separately evaluated but they must be considered together in arriving at final results. Fuel consumption may be definitely evaluated but fuel cost is not so easily reduced to figures that have general application.

Conclusions From Analysis

Of the several other factors discussed the only ones that are likely to be of importance are cost of machinery, bunker capacity required, and fresh water required.

On the facts brought out the author thinks that certain conclusions are possible. The first is that the larger the size of turbine plant, the more nearly the fuel economy approaches that of the diesel engine, but that no turbine plant yet built will equal diesel engine economy. In the smaller powers required for cargo ship drive the superiority of the diesel machinery, the relative fuel consumption with the two types of machinery, would in all cases be favorable to the diesel. Relative fuel prices at the points where the ship under consideration is to bunker must be applied to get relative total fuel cost. Fixed charges should be evaluated and may be expected to be somewhat higher for the diesel driven ship.

Having established the fixed and operating charges for both types of ships the gross earning capacities will be determined. This will usually be favorable to the motorship because of its greater cargo capacity due to smaller fuel and water requirements. Having evaluated all of these various factors, a final balance will show the relative net earning capacities of the two ships. It will be found that for any given set of conditions the motorship is more likely to be the better investment in the small power range, such as would be required for cargo ships, but as the installed power becomes greater a point will be reached beyond which the steamer is definitely superior.

Finally it should be known that the foregoing discussion is based on conditions confronting the owner and operator of ships in the United States and is not intended to apply to conditions in other countries.

8. Full Scale Trials on a Destroyer, by Commander H. E. Saunders, CC., U.S.N., council member, and Lieut. Commander A. S. Pitre, CC., U.S.N., visitor.

This is a valuable paper in advancing the knowledge of predicting from model experiments what the full sized vessel will do. The authors are officers of the construction corps of the navy, attached to the experimental model basin at the Washington navy yard. In the beginning of the paper it is stated that the fundamental endeavor of the model basin is to predict accurately the performance of ships and the effect of variables on this performance. Whether these aims are fully realized depends on the accuracy of self-propulsion model tests in indicating the full scale performance, and on corresponding reproduction of the effects of variables from model to full scale. While the latter is true, for the moderate speed vessels, there are added complications for high speed vessels especially in the reproduction of effects of variables in the full scale.

In an effort to determine the extent to which these endeavors were being realized in its work, especially with regard to the design of high speed vessels, the United States experimental model basin, in cooperation with the bureau of construction and repair, the bureau of engineering, and the board of inspection and survey of the navy department planned and undertook extensive full scale trials on the destroyer HAMILTON.

In the paper, including five appendices, and covering 35 pages, the authors have brought these results to the attention of the industry. Perhaps the best way to briefly outline the work done and the results obtained is to quote below the conclusions stated.

Although the trials described furnish data for only one type of ship, and that a special one, the following conclusions may reasonably be drawn:

1. Full-scale tests, when sufficiently extensive and carefully conducted, will furnish data very nearly as accurate as can be obtained with model tests under laboratory conditions.

2. To insure this accuracy, corrections for all tangible sources of error must be applied to the observed data.

3. These trials further emphasize the necessity for measuring thrust. Not only does this make possible a more complete analysis of propeller performance, but, more important, it supplies the only means for analyzing hull performance.

4. In comparing model and full-scale performance, it is essential to determine comparative hull and propeller efficiencies. On this basis, the trial shaft horsepower obtained for the HAMILTON is in reasonable agreement with model prediction for the region outside of cavitation.

5. The loss in efficiency of the ship propellers, compared to the model, and the difference in efficiency of the two ship propellers, are due to variations in shape and surface of the blades, especially of the backs.

6. The fact that in the cavitating range the efficiencies of the model and of the full-scale propeller approach equality indicates that after breakdown the influence of blade surface and shape becomes less pronounced.

7. The beginning of cavitation as determined by water tunnel tests is in reasonable agreement with trial results.

8. Predicted corrections in revolutions and shaft horsepower during cavitation are primarily dependent on a knowledge of correct ship thrust. This necessitates a more accurate determination of the thrust. Because the model propellers suffered a greater loss in efficiency than the ship propellers, the correction for revolutions is slightly higher in the model than in full scale. The same conclusion applies to shaft horsepower.

9. Frictional resistance is still, perhaps, the most elusive and uncertain element in the conversion of model test data to predicted full-scale performance.

10. Notwithstanding that all existing methods of computing frictional resistance embody, in one form or another, the use of a factor, loosely termed "roughness allowance," the selection of which is largely governed by judgment and experience to compensate for ultimate variations in surface conditions between model and full scale, the resulting model-basin predictions for effective horsepower are within engineering limits.

11. A series of carefully conducted trials in which thrust measurements are made is essential to a comprehensive study of variations in ship frictional resistance and for correlating experimental data from friction planes.

12. The data of both trials, observed at different times, have been corrected and reduced to standard conditions. This insures, as far as possible, uniform conditions, thus making possible fair and useful comparisons. Since the corrected results of both trials are in practical agreement, the three-run method appears to possess no superiority over the two-run method. For a given number of runs, the two-run method affords a greater number of spots and permits a better spacing of the experimental spots; for this reason it is superior.

13. For high-speed ships, measurement of speed through the water by the existing type of resistance log is not practicable.

14. For fine vessels of the destroyer type, which have a marked change of trim under way, the variations of the measurements taken by the pressure speed log, when compared to the observed speeds cor-

rected for current, are greater than desired. For purpose of analysis and comparison with model prediction, it should be possible to measure ship speeds through the water consistently ti within ½ of one per cent.

9. Notes on S. S. Manhattan with Some General Comment on North Atlantic Liners, by Ernest H. Rigg, vice president.

This paper is not, nor is it intended to be, in any sense, a complete description of the MANHATTAN, as such descriptions will be found in *Marine Engineering and Shipping Age* for August, 1932; in MARINE REVIEW for September, 1932, and, for the machinery and trials, in the *Journal of the American Society of Naval Engineers* for November, 1932. The author, who is naval architect of the New York Shipbuilding Co., builder of the MANHATTAN and WASHINGTON, is perhaps more than any other single individual responsible for the naval architectural features of these vessels. His comments, therefore, are of special interest.

Reference is made to the principal particulars of the MANHATTAN. The question of carrying cargo on North Atlantic liners is discussed briefly with the general conclusion that at the present time, more so even than in the past, it may be found desirable to have separate vessels for passengers and for cargo in the transatlantic service.

Various features of the MANHATTAN such as roominess, safety, loading and strength are discussed briefly in an interesting manner.

A valuable part of the paper is concerned with the performance of the vessel since entering service, keeping in mind that the propelling machinery consists of twin screw Parson's triple series turbines supplied with steam at 400 pounds pressure and 675 degrees Fahr. total temperature by oil fired Babcock and Wilcox watertube boilers using distilled water only; four bladed propellers out-turning. The record for the ten round trips to May, 1933 is as follows:

Direction, speed in knots, mean ocean displacement in tons, fuel coefficient for all purposes as given: Eastbound, 20.06 knots, 30,390 tons, and 35,750 — Westbound, 20.51 knots, 28,585 tons, and 36,350—Average, 20.285 knots, 29,487 tons and 36,050.

The fuel coefficient used in the above performance record is the modified admiralty coefficient and is arrived at by multiplying the displacement to the two-thirds power by speed cubed and dividing the result by total fuel oil in tons per day. The oil fuel in tons per 24 hours for all purposes, average for ten voyages eastbound was 220 and westbound 222.

Attention is called to the fact that the MANHATTAN has set up a record of over 50 per cent capacity of passengers carried, which is a good 60 per cent or better making allowance for three berth rooms occupied by two people and two berth rooms with single occupants. It is believed that her record will be better when a full year's performance is known. This is a definite proof of her popularity. The author on three single trips as a passenger heard much favorable comment on the comfort and roominess of the vessel.

10. Launching of the Normandie by A. See, member.

The author is chief engineer of the hull department of Chantier & Ateliers de Saint-Nazaire, builder of the NORMANDIE. In this paper he has outlined briefly the construction of the berth on which the NORMANDIE was built. A study of the launching arrangements began in December, 1931 and were continued until September, 1932. The paper presents, with diagrams, a complete and interesting account of the launching calculations and arrangements. A diagram is is given showing the results of calculations of the hydrostatic forces and moments.

The releasing gear is described and illustrated in detail. The static launching curves are plotted. Structural design of the cradle is described and illustrated. There is a longitudinal elevation of the fore poppet with specifications. Arrangement of timbers and wedges connecting ship to cradle amidships, is illustrated. Greasing the ways and checking of the ship are discussed clearly and specifically. Actual launching operations are described.

This paper is a valuable contribution to specific information on launching of great liners, and it must be borne in mind that the NORMANDIE, 1027 feet in length overall, with a launching weight of 28,100 tons, 26,800 for the weight of the ship and 1300 tons for the weight of the cradle, is the first vessel of over 1000 feet in length to be launched. It is, as the author states a memorable event in the records of naval architecture.

11. Water Circulation and Gas Paths in Naval Boilers, by Rear Admiral Samuel M. Robinson, U.S.N., vice president.

The author is chief of bureau of engineering, navy department. The paper is 39 pages in length and is very fully illustrated. Its purpose and general scope is given in the foreword as follows:

This paper covers a discussion, with some data, of the gas paths and the water circulation in boilers of the types used in navy vessels. While exact counterparts of these types of boilers are not found in stationary boiler practice, the principles discussed should prove of some interest to the designer of stationary boilers. The merchant marine is tending toward the type of boiler found best suited for navy use, but the ratings at which they are operated have been about one-third of the rating used at full power by the navy. This has been due to a less exacting demand for conservation of weight plus the fact that the boilers on a merchant vessel will operate at or near their designed rate while the boilers on a naval vessel will operate a relatively short time at maximum designed rating.

This paper is a valuable contribution to modern steam engineering and the society is indebted to the author and the navy for making this information generally available to the industry.

12. Water Conditioning and Related Problems of Marine Boiler Operations, by A. C. Purdy, associate member.

The subject of this paper is of great importance to the efficient operation of boilers. The problems in connection with water conditioning for continuous steam production are stated as follows:

1. The prevention of scale formation. That scale must be prevented from forming on the evaporative surfaces of the boiler is of prime importance. However, the question of scale formation in the pre-boiler equipment, the feed lines and heaters must not be overlooked. The two problems differ in their solution and will be treated separately.

2. Control of corrosion. Here again the problem is two-fold, involving a protection of feed lines and economizer tubes on the one hand, and boiler surfaces on the other. Corrosion in steam lines and turbines is a related problem, which, although not directly related to the chemistry of water conditioning involves the question of oxygen, and the removal of combined or uncombined carbon dioxide from the feed water. Cases will also be cited where serious corrosion developed in super-heaters and turbines due to faulty water treatment. Boiler metal cracking, or embrittlement, may properly be considered as a special type of corrosion and is discussed as such.

3. Dry steam production. When water is treated to prevent scale formation by whatever process other than evaporation, the amount of dissolved solids in the boiler is greater than without treatment. Frequently, also, the concentration of suspended matter is higher. These factors affect steam quality and must be controlled in order to protect superheaters and turbines. However, to insure economy of operation, their control should involve a minimum of blowdown.

New Officers and Members

DURING the past year applications have been received for 40 members, 22 associate members, and seven juniors, making a total of 69. These

(*Continued on Page* 38)

Cargo Handling and Stowage of Ships

How to Obtain Greater Efficiency

By H. E. Stocker*

IT IS of vital interest to the industry that the problems of cargo handling and stowage should be subjected to an intelligent and experienced analysis with at least two objectives in view: 1. For the purpose of eliminating uneconomic methods; 2. To focus attention on these problems so that those responsible for the design and arrangement of ships and the layout of piers and docks will be properly influenced by the necessities of practical operations and thus prevent the wastefulness of blind adherence to precedent.

The author of this paper has had these objectives constantly in mind in his contributions to the dock management section of MARINE REVIEW during the last five years. His practical contact in actual ship operations and his study of this subject particularly qualify him to make an authoritative analysis, such as presented in this paper, for the benefit of shipping.

Under the head of economic ship operation, a ship's profit producing capacity is considered in relation, not only to its own efficiency, but also to the terminals which serve it. Though savings in cargo handling costs are emphasized as desirable, it is pointed out that in most instances time saved in port is an even more important matter. In one instance a reduction of 33 1/3 per cent in port time with a consequent reduction of 25 per cent in ship operating costs was made possible because 25 per cent less ships did the work formerly done by the whole fleet. This saving exceeded by more than 80 per cent the savings in cargo handling costs by utilizing improved methods and the elimination of waste.

Production of Port Time

To determine whether port time is excessive, the particular operation should be compared with similar operations and a thorough analysis should be made of comparable methods of cargo handling with the view of arriving at improved methods and equipment. These studies should extend to every detail of operation. Numerous examples of how this has been done successfully are given. In a similar manner attention is called to losses due to inefficient handling of cargo within the ship, and here again examples are given showing how improvements have been possible.

Consideration is given to terminals and it is pointed out that modern methods and equipment have their effectiveness nullified if the space on the terminal is inadequate, though this does not mean that expensive elaborate terminals must be provided.

In discussing the ship the author emphasizes the fact that ship design must be based upon an exhaustive analysis of all details affecting cargo handling and stowage if port time and cargo handling costs are to be maintained at a low point. Advantages of such features as steel and wooden hatch covers are compared, and after full consideration the author favors steel hatch covers of the best modern design. A study is made of the size and arrangements of hatches. In this case individual preference and tradition should be replaced by a careful analysis of the requirements of economical transportation. In a number of cases hatches on new and costly ships have been an obstacle to the economical operation of the ship. Coamings to hatches should be low or eliminated altogether.

The question of winches is considered with the recommendation that three to four winches per hatch are advisable at the larger hatches in order to permit working two to three gangs to a hatch. It is pointed out that some of the ships of the Norwegian American line have six winches grouped around the mast, three for each hatch. These six winches, working with three booms per hatch give a very flexible and effective operation. Winch controls should be located so that the winch driver has a clear view of the operation in the hatchway as well as on deck. Full power for winches should be available at all times during cargo handling operations.

Length of Booms, Side Ports

Definite examples are given of the efficient layout of a ship's deck particularly with reference to the carrying of deck loads. Arrangement necessary for lumber carried on deck is discussed in some detail.

Cargo booms are given consideration and the author inclines toward the greater efficiency possible with long rather than short booms. Examples are given of effective boom length. The use of heavy lift booms is also referred to.

Throughout the remainder of the paper, attention is given to the arrangement and value of side ports in speeding up port operation. A number of examples and illustrations are cited. Instances are given of the necessity of altering terminals to facilitate the use of side ports with special reference to such alteration and the use of Barlow elevators in serving the new Grace line ships at Seattle. Among other features mentioned are the use of elevators for cargo handling.

Considerable attention is given to ventilation. A ventilating system should provide a rapid, vigorous and well distributed circulation of air in the cargo compartments giving a complete change of air at frequent intervals. In this connection the ventilating equipment installed on the Black Diamond ships developed by M. J. Hanlon, operating manager of this line, is described at some length because of its effectiveness for ships in the transatlantic trade. The essential problem which has been successfully solved in this system is the maintenance of a temperature balance between the air of the holds and the atmosphere. This is possible only by forced ventilation. It is said that this effective ventilation system was installed complete for the cargo compartments in six ships at an equipment cost for fitting one single compartment for refrigeration.

On Financing Improvements

The latter part of the paper is devoted to a discussion of financing improvements and it is suggested that the number of ships with obsolete cargo handling gear turned out in 1928 and 1929 indicates that it was not a lack of financing but rather the lack of a progressive point of view and an energetic management which is the principal cause of the slow progress in modernization of cargo handling features of ships. Methods of financing improvements are mentioned and reference is made to the payment for equipment through savings which result from its use.

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*Abstract of paper entitled *Cargo Handling and Stowage,* by H. E. Stocker, presented at the annual meeting of the Society of Naval Architects and Marine Engineers at New York, Nov. 16. The author is secretary-treasurer, Newtex Steamship Corp., New York, and associate editor of MARINE REVIEW, on dock management and stevedoring.

WELDING ROLLED STEEL DIESEL ENGINE STRUCTURES

Part II

BY EVERETT CHAPMAN
Lukenweld Inc.

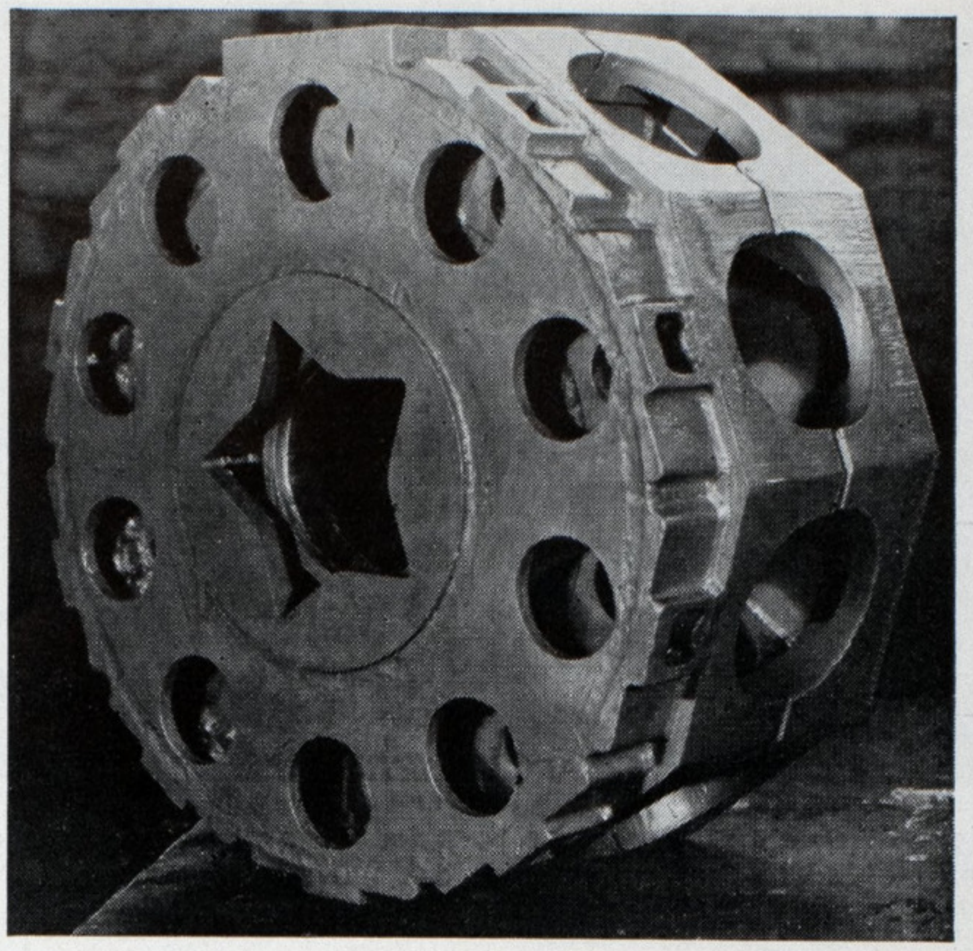
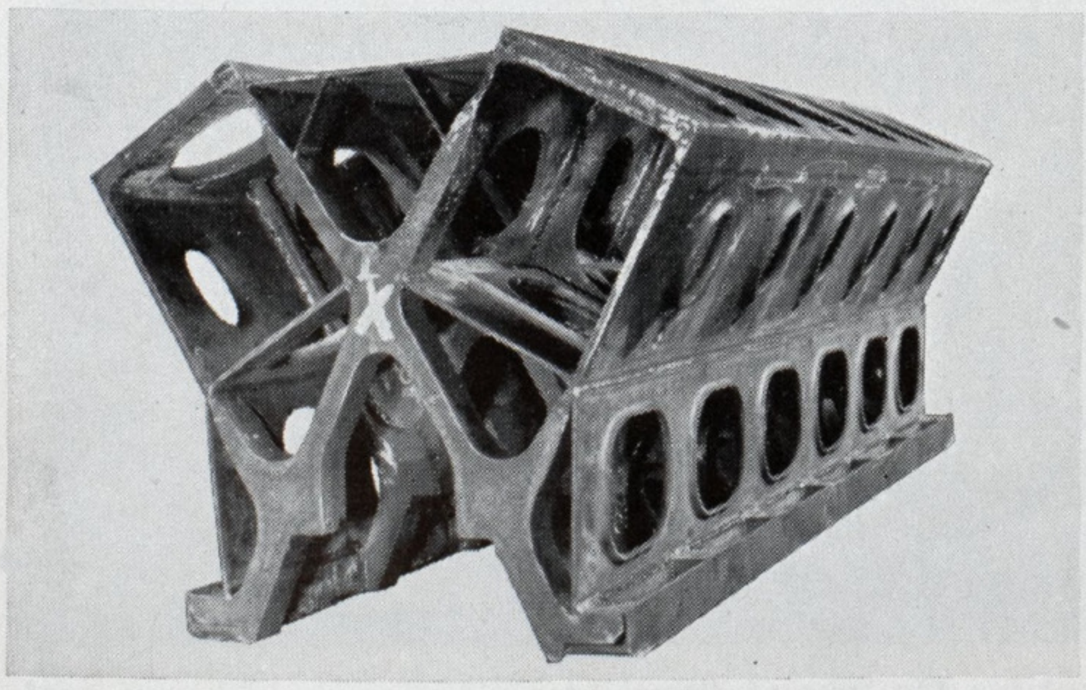


Fig. 9—Welded steel crankcase for a 10-cylinder 600-horsepower radial engine. Weight is less than 1 pound per horsepower

BASED upon tests of the experimental single-cylinder welded diesel engine frame described in the preceding section of this article, construction was undertaken of a 1000-horsepower twin-six engine, in which the entire gas load was carried by the welds. Fig. 13 shows the type of flame-cut main frame which was used. This frame transmits the gas load of one bank of cylinders past the gas load of the other bank of cylinders, and into the main bearings. The minimum weight design is one in which the material is loaded in straight tension. The flexibility of flame-cut steel plate in meeting this ideal condition is well illustrated by the frame member of Fig. 13. The stub ends of the frame could not be run through to the top deck because the stagger of the connecting rods produced a 3-inch offset in each cylinder with respect to the cylinder in the other bank, which necessitated the use of a transition joint.

Since the transition joint had a peculiar shape, more experimental work was done to determine an efficient design for the joint before proceeding with the engine. Fig. 14 shows the result of a tensile test of the experimental joint. The stubs were inserted in the notched plate and welded strictly in accordance with the photoelastic studies. The experimental joint simulated the condition in the engine where the joint carries an impact load of 19,000 pounds. The joint shown in Fig. 14 fractured outside the weld, through the plate, at a load of 212,000 pounds. Tensile tests of such joints in conjunction with a coat of brittle varnish are very instructive. Fig. 12 shows the crankcase



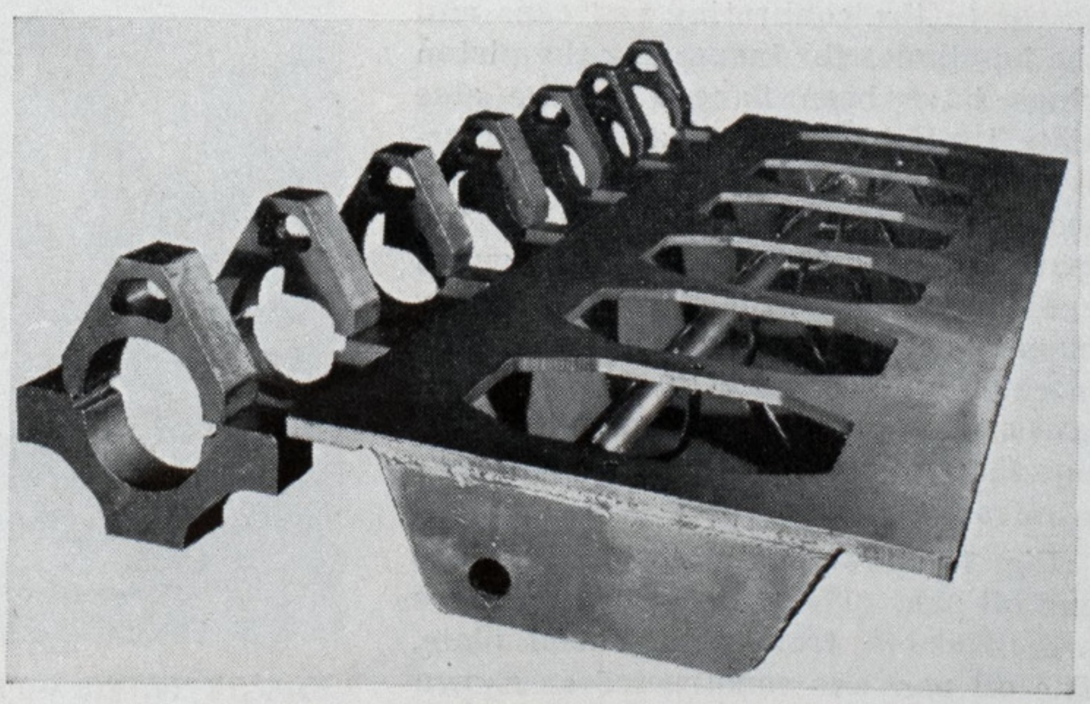


Fig. 10 (Left)—One of the later stages in fabricating the crankcase with the inner deck, side plates and stiffening ribs added. Fig. 11 (Right)—Main bearing caps and oil pan. The main bearing girders are flame cut from 4-inch plate

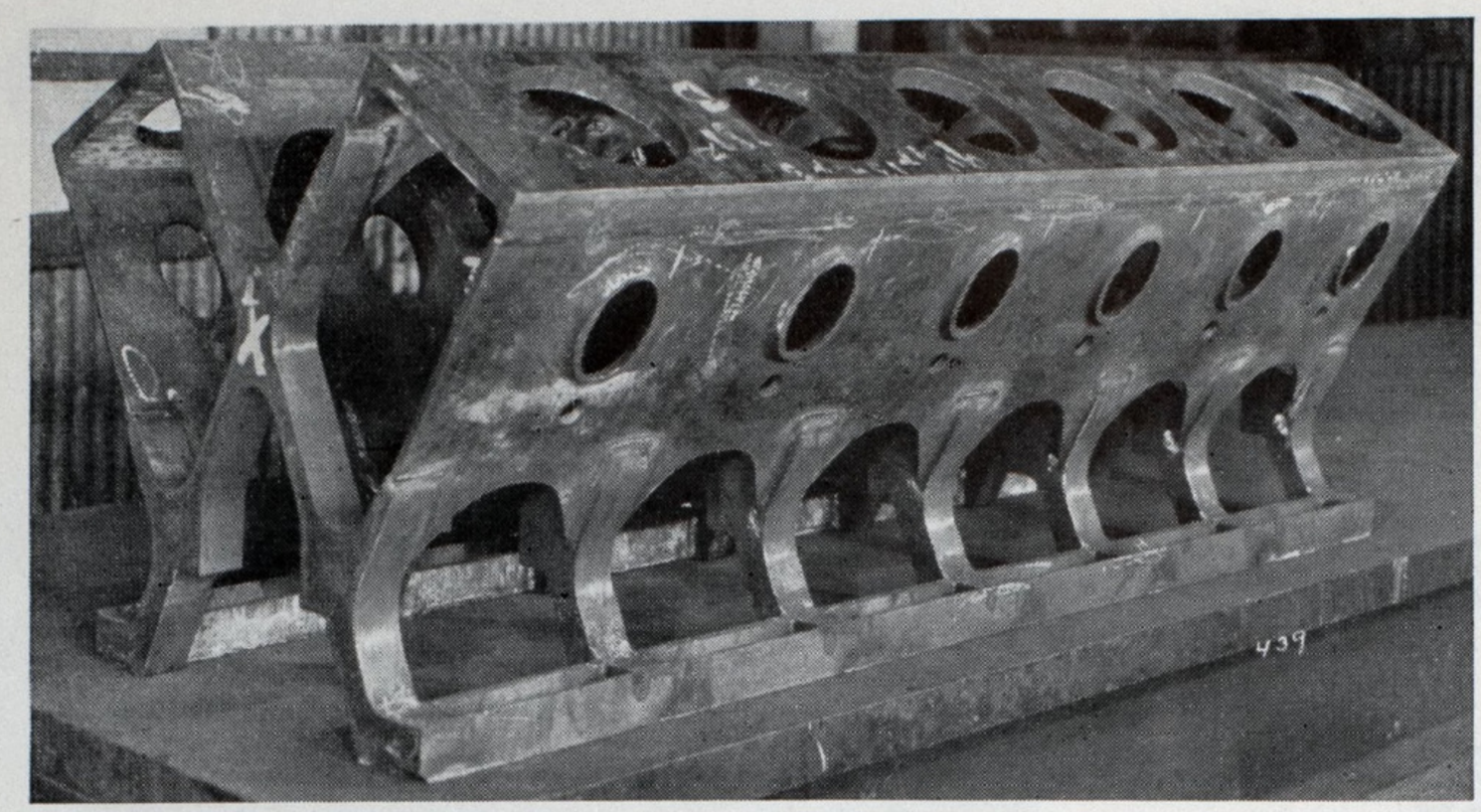


Fig. 12—One of the early stages in the assembly of the crankcase. The top deck was welded to the transition plate with a single butt weld running the length of the engine on each side

partly finished. The top deck was welded to the transition plate with a single butt weld running the entire length of the engine on each side. The gas load of each cylinder is then carried through the butt weld at the top deck, and through the two transition points to the main bearings. In the condition shown in this illustration, each weld, including the transition points, was radiographed by means of radium to discover any imperfections, unfused points or porosity that might have existed. The crankcase was also thoroughly inspected for undercuts and surface discontinuities.

Fig. 16 is a typical radiograph of one of the transition joints. Radiographs show imperfections as dark lines or dark spots. In the construction of two of these crankcases, it was not necessary to chip and re-weld any of the joints.

Thin Sections Stiffened

Fig. 10 shows a further stage in the progress of the crankcase. The inner deck which carries the lower end of the cylinder liner is in place. The side plates and stiffening ribs have been added. The handholes providing access to the connecting rod caps and the handholes for inspecting the piston rings have been flanged in the side plate itself. In welded steel construction, there is a tendency to use thin sections because of the strength of the material. It is necessary to guard against unsupported areas of any magnitude in thin material when the mechanism is one which may set such areas in resonant vibration. The flued handholes stiffen the thin plates admirably against this phenomenon.

Fig. 11 shows the main bearing caps and oil pan. The main bearing girders are flame-cut from 4-inch steel plate. The oil pan was constructed as shown to provide a tie for the bottom legs of the main frame members. Fig. 15 shows the completed crankcase as it left the weld shop. It is mounted on the oil pan to illustrate the manner in which the oil pan forms the bottom tie for the complete case.

Built in the high strength, welding quality alloy steel, this crankcase has a weight of about 2.6 pounds per horsepower. The entire engine weighs less than 10 pounds per horsepower running on the test block. Calculated from the indicator card, each weld in this structure is subjected to an impact load of 38,000 pounds occurring twelve times each second. Referring to Fig. 6 (STEEL, Aug. 28, page 33), the recently completed 300-hour full load run indicates that the frame has been subjected to a number of cycles of stress far beyond that necessary to establish the fact that the stress concentrations which undoubtedly exist in the frame are not large enough to raise the average stress above the endurance limit for the alloy steel from which the frame is made.

The performance of this welded steel crankcase offers conclusive proof that welded joints can be designed and constructed commercially to handle, at a high stress, the most severe type of load encountered in modern mechanical practice—that of repeated impact.

Applied to Radial Engine

Another application of welded steel construction to diesel crankcases is shown in Fig. 9. It is a crankcase for a 10-cylinder 600-horsepower radial engine, constructed in welded steel, using as the base metal the same high strength alloy steel employed in the twin-six engine. All weld metal specimens deposited with the alloy electrode used to fabricate this case and the twin-six case have a yield point of 65,000 pounds per square inch, an ultimate strength of 95,000 pounds per square inch, and an elongation in 2 inches of 24 per cent. Here again the main loads are carried by a weld and it is necessary only to pay strict attention to all the design details to insure that such a case will exhibit satisfactory performance.

Attention is called, in Fig. 9, to the use of steel castings to form the periphery of the cam pocket. The contours involved around the push rod guide bushing and the bolts tying the two halves of the engine together were sufficiently intricate to dictate the use

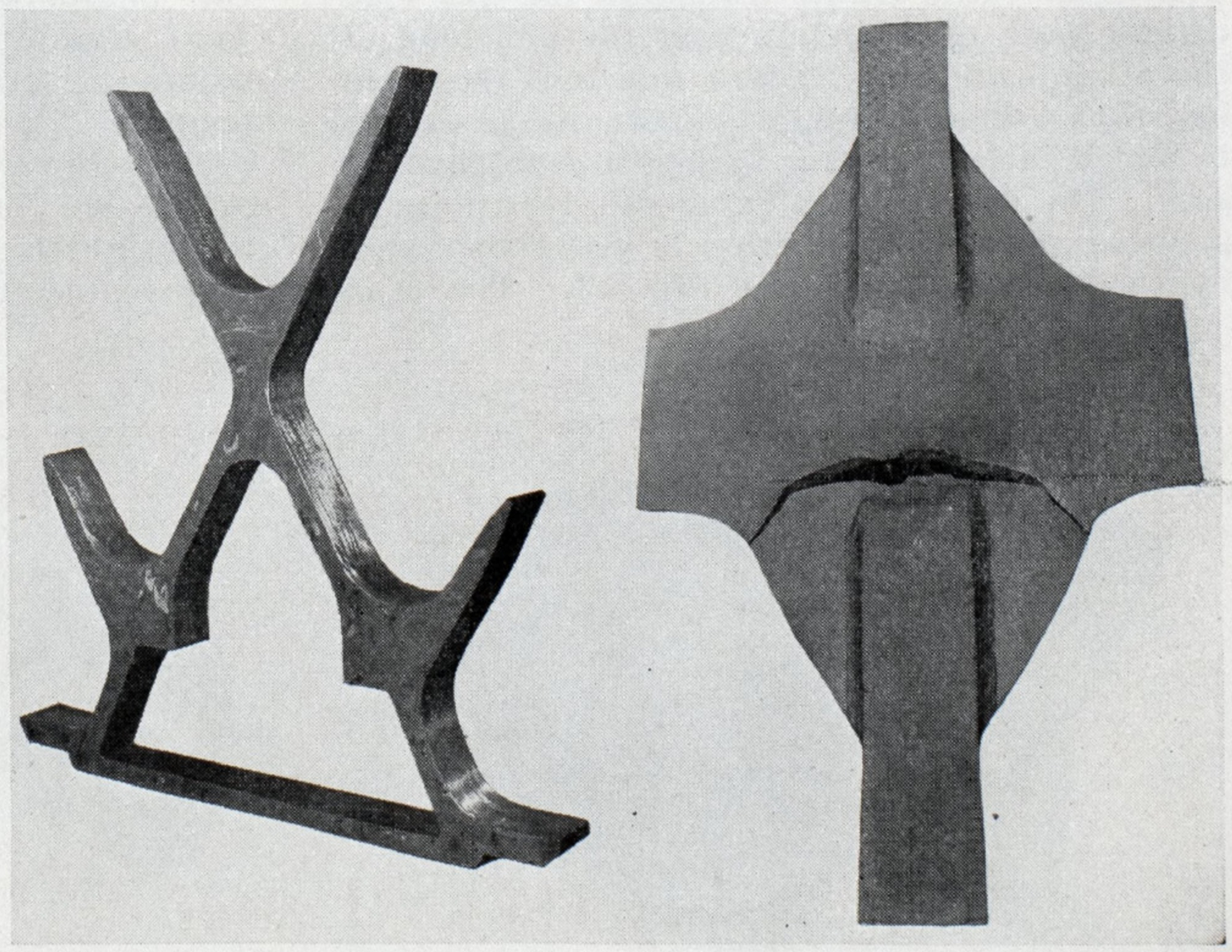


Fig. 13 (Left)—This shows the type of flame-cut main frame which was used in construction of the 1000-horsepower twin six engine. Fig. 14 (Right)—Tensile test of a peculiarly-shaped transition joint. The break occurred outside the weld

CONSTRUCTION of a 1000-horsepower twin-six diesel engine crankcase utilizing welded steel structures is described in this article, the second and last of two articles. This crankcase weighs only 2.6 pounds per horsepower and the entire engine less than 10 pounds per horsepower. In previous practice, weight ranged from 40 to 250 pounds per horsepower. Under construction today is a welded diesel engine for railroad main line high-speed motive power, and others are in prospect. Also described is a welded diesel radial aircraft engine crankcase weighing less than 1 pound per horsepower. Part I, discussing preliminary design, appeared in the November MARINE REVIEW. *These two articles constitute a paper presented in Atlantic City, Aug. 23, before the Oil and Gas Power division of the American Society of Mechanical Engineers. The author is vice president in charge of engineering, Lukenweld Inc., division of Lukens Steel Co., Coatesville, Pa.*

of a steel casting. The parts were cast in units of one per cylinder and the entire casting assembly welded into one ring, which was inspected and machined before welding it into the rest of the assembly. The weight of the radial engine crankcase is less than 1 pound per horsepower.

In an application such as this, it is essential that the carbon content of steel castings be maintained below 0.20 per cent and that the castings be of the finest grade obtainable. For use in welded steel assemblies, electric furnace castings are highly desirable because of the close control over both pouring temperature and analysis. The small amount of dissolved gases present offers favorable welding characteristics.

Welded steel crankcases of the types discussed enable the engine builder to offer to the user of mobile prime movers a light-weight, highly efficient and powerful unit, embodying all the advantages of the diesel principle. Winton Engine Corp., Cleveland, with which it has been a privilege to work in this development, can offer today an engine-generator unit supplying 750 kilowatts of electric energy which, including all auxiliaries, will weigh 30 pounds per horsepower.

Railroads See Possibilities

Railroad vision has enabled immediate application of this notable prime mover to main line service. Under construction today is a welded steel engine structure which will be used in the power unit of the Union Pacific system's 110-mile per hour high-speed passenger train. The Chicago, Burlington & Quincy's high-speed passenger train will have as its motive power a 600-horsepower diesel engine of welded steel construction.

Some progressive railroad undoubtedly will take the next step and employ two or three of these units on a single chassis for main line freight movement at an economy never before approached.

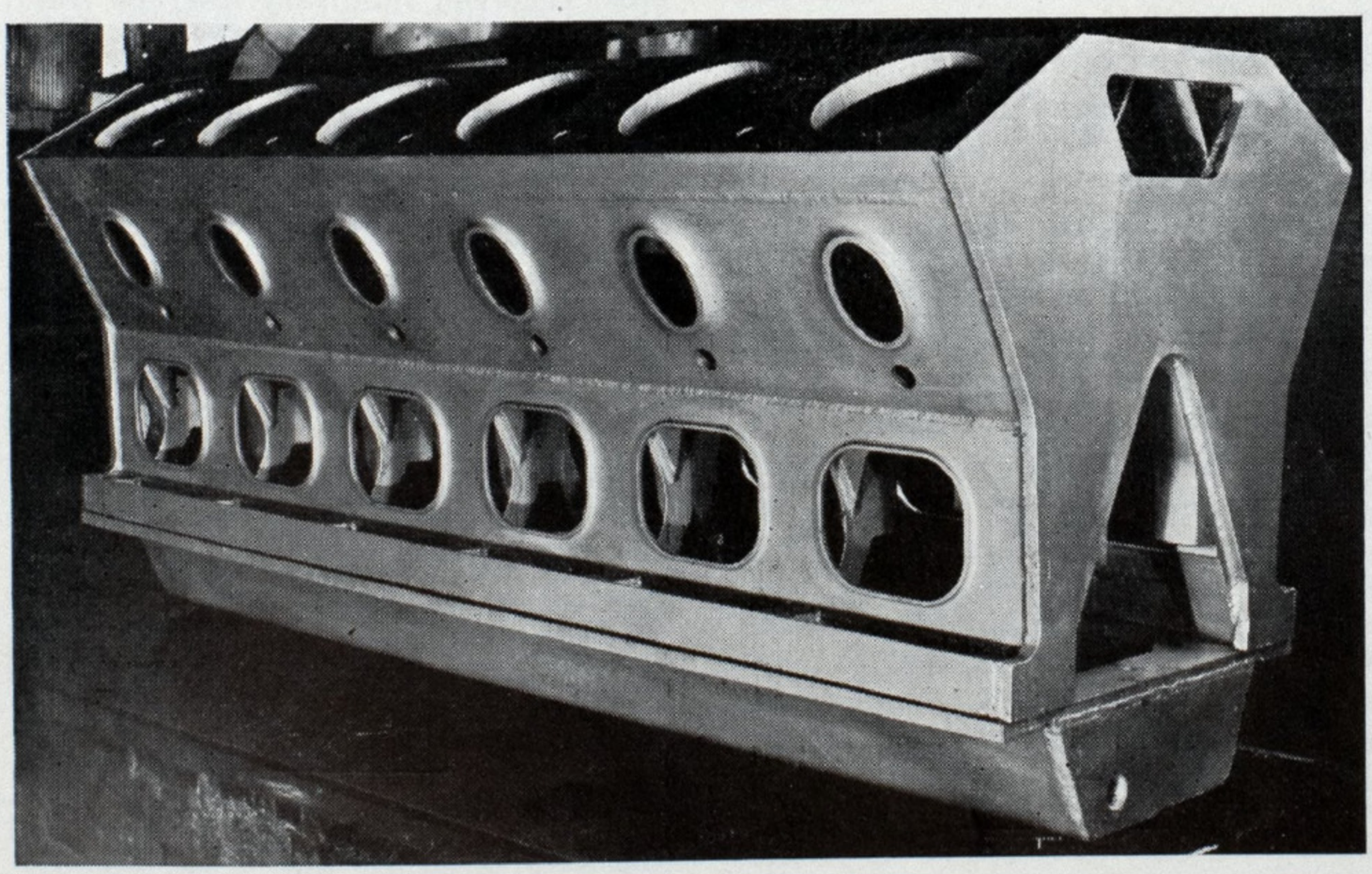


Fig. 15—A view of the welded crankcase as it left the weld shop. It is shown resting on the oil pan to show how the latter forms the bottom tie for the complete case

Los Angeles Business Up

Commerce through the port of Los Angeles for the month of October continued its favorable September showing of approximately $10,000,000 higher than for the same month a year ago, and was an increase over September of this year of more than $3,000,000.

Volume in tonnage also showed

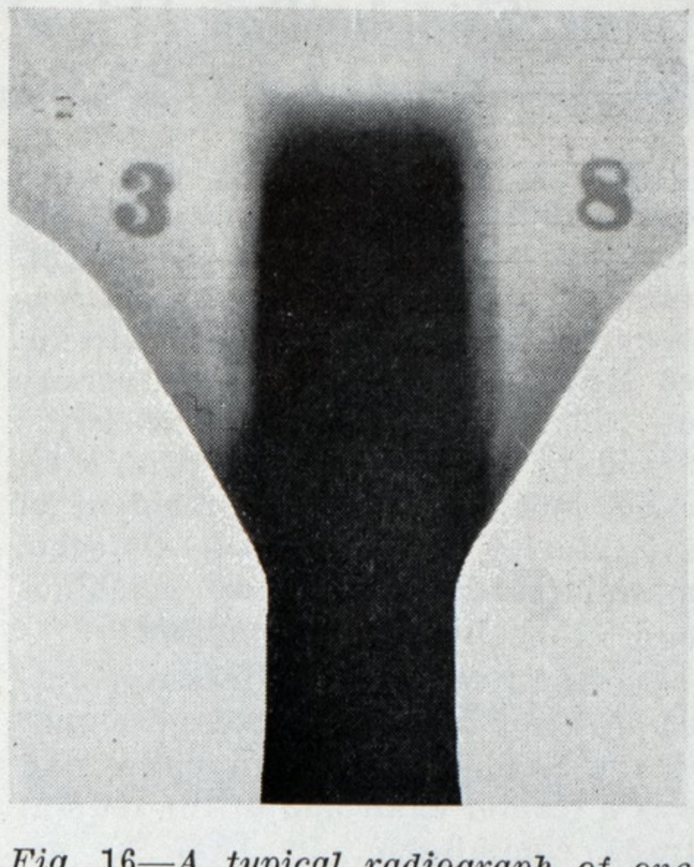


Fig. 16—A typical radiograph of one of the transition joints of the type tested in Fig. 14

substantial gains with a total inbound and outbound movement of 1,450,000 tons. Total value of commerce at the port for the month amounted to $75,617,000.

Much of the tonnage increase over both the preceding month and preceding year is due to movement just getting under way (at the beginning of November) of extensive shipments of crude oil to the Atlantic coast on contract recently entered into between the Standard Oil companies of California and New Jersey.

Thrust Bearing Design

Marine engineers and naval architects will find much valuable information in a recently issued bulletin by the Kingsbury Machine Works Inc., Philadelphia. Definite engineering data is given for applications of new standard thrust bearings and journal bearing mountings for horizontal shafts, ranging all the way from 2¾ inches to 23¼ inches in diameter.

The Kingsbury thrust bearing, widely known standard for marine service, carries its load on oil films formed over pivoted shoes that are copiously lubricated. Invented by Dr. Kingsbury, this thrust bearing has proved of fundamental engineering importance and has released the designer from limitations previously imposed by the thrust bearing problem.

Kingsbury journal bearings are in effect single shoe bearings of the oil film type, this form yielding the lowest friction coefficients consistant with a desirable degree of safety. Their mountings, when independent of the thrust bearing, are usually designed to match the mountings of the latter, a feature useful in dredge pump applications. There is also a line of propeller shaft bearings.

Former Shipping Board Head Edward N. Hurley Dies

Edward N. Hurley, sixty-nine, wartime chairman of the United States shipping board, died Nov. 14 in Chicago of pneumonia. Mr. Hurley was born in Galesburg, Ill., and attended Knox college and the University of Notre Dame. He organized the Standard Pneumatic Tool Co., Chicago, and recently was president of the Hurley Machine Co., Chicago, manufacturer of washing machines and other household appliances.

In 1913 Mr. Hurley was appointed United States trade commissioner to the Latin-American republics and was a former chairman of the federal trade commission. In 1917 he resigned the latter post, but a short time after was made head of the shipping board during the war, resigning in 1919.

As chairman of the United States shipping board during the most crucial period of its existence, Mr. Hurley proved to be the right man in the right place. Under his guidance the most colossal shipbuilding program in history was successfully initiated and carried out. He made the phrase "bridge of ships" a reality and by the magnificent shipbuilding effort put forth by the super-organization he headed, contributed more than any other agency to the discouragement and ultimate defeat of the Central powers.

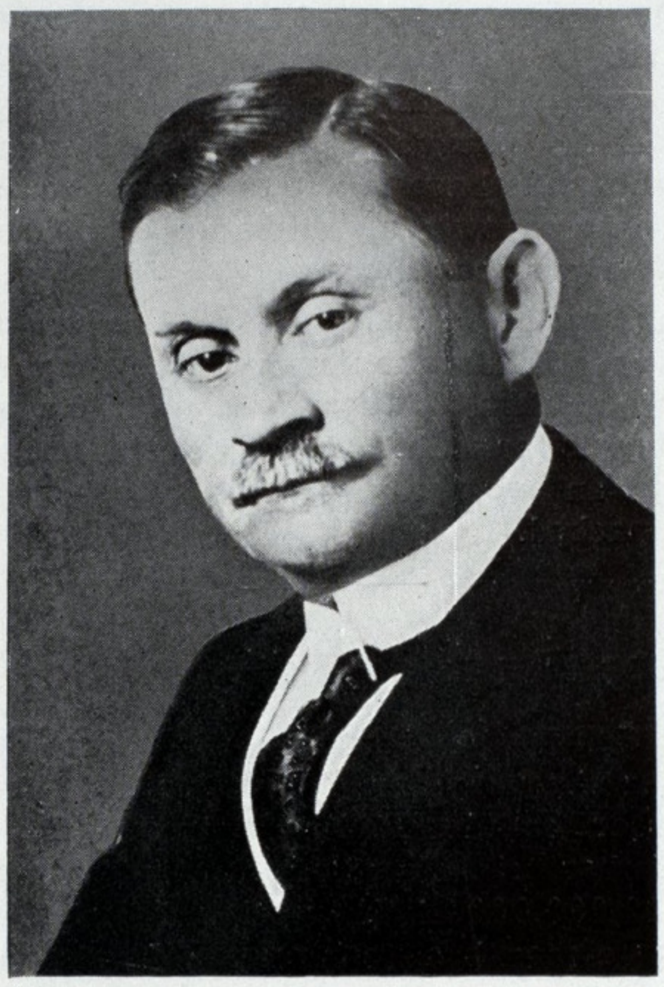
This vast shipbuilding program involved the expenditure of some $3,000,000,000 and the construction of 2500 vessels. Though successful in all of his endeavors, his greatest and most important task was his successful handling of the shipping board during this period. At the time he took charge, a disturbing controversy was destroying the effectiveness of the shipping board in building ships. He was called in by President Wilson and told to go the limit to cut red tape and to let nothing interfere with the main objective. This he did for two years until July, 1919 when he resigned because he felt that his work had been done.

A fitting tribute has been paid to him R. J. Baker, secretary of the American Steamship Owners' association:

"American shipping has lost one of its staunchest supporters in the death of Edward N. Hurley," said Mr. Baker. "Although he resigned from his post in 1919, Mr. Hurley remained until the day of his death an energetic exponent of an adequate American merchant marine. He was the author of an important plan for the preservation of ships in foreign trade, and contributed three books to the literature of the sea.

"There is no more inspiring story in American history than Mr. Hurley's epic achievement on the North Atlantic. The allied situation was desperate. 'Ships, ships, and more ships' was the cry. Vessels were launched in thirty days and sent to sea in thirty more. We were confronted not only with the problem of getting 2,000,000 men to France; we had to send millions of tons of supplies to keep them there. No single individual contributed more to the winning of the war than did Mr. Hurley.

"The measure of success is indicated by his standing in the maritime world. He was successful in many lines, and held a number of important posts, yet he will be remembered chiefly for his work with ships. His accomplishments are all the more remarkable when it is remembered that he came from the interior.



"It is interesting to note that in addition to building the 'bridge to France,' he also contributed the implement that made the construction possible. He virtually originated the development of pneumatic tools in this country, and his pneumatic hammer was of invaluable aid in the wartime shipbuilding program.

"Mr. Hurley more than any other man put the American flag back on the seas. Before the war we had 17 ships in overseas trade. Today, several hundred American flag vessels connect our ports with every market on earth. These ships constitute a living memorial to the heroic labors of Edward N. Hurley."

The Italian liner REX, arrived in New York on Nov. 2, carrying a total of 1249 passengers in all classes.

Sir John H. Biles Dies, Noted Naval Architect

Sir John Harvard Biles, world known British naval architect, died at his home in Surrey, England, Oct. 27, at the age of 79.

He was born in Portsmouth, England, Jan. 6, 1854 and was educated at the Royal School of Naval Architecture and Marine Engineering and the Royal Naval college, Greenwich. From 1877 to 1881 he served as naval constructor to the admiralty resigning to become naval architect and manager of the Clydebank shipyard.

From 1891 to 1921 he served as professor of naval architecture at Glasgow university. Since that time until his death, he has served on various committees devoted to naval architecture and marine engineering investigations. Sir John Biles has been called the greatest living authority on naval architecture. He was well known all over the world and had visited the United States, Canada, Japan, China, Australia, India, as well as nearly all the European countries. He acted as consulting naval architect to the high commissioner for India. During the war, he carried out the design and supervision of construction of a unique type of river craft for the British forces in Mesopotamia. He also served as chairman of the admiralty committee on submarine cargo vessels.

At the time of the TITANIC disaster inquiry in 1912 he acted as assessor. In 1929 at the inquiry into the loss of the VESTRIS he testified before the British board of trade.

Besides being knighted for his notable achievements in naval architecture and marine engineering, he also received honorary degrees from the universities of Harvard, Yale and Glasgow. He was the honorary vice president of the British Institution of Naval Architects, and was a member of the Institute of Civil Engineers and the Society of Naval Architects and Marine Engineers of the United States.

During the course of his long and active career, Sir John wrote a number of technical books including the *Marine Steam Turbine*, and *Design and Construction of Ships*. He also contributed numerous technical papers to the transactions of engineering societies. In 1876 he married Emma Jane Lloyd. They had two daughters and a son.

Due to the closing of the Canadian Soo ship canal on Dec. 1 for repairs, all craft plying the upper lakes in the last two weeks of navigation must use the Michigan Soo canal.

Estimating Frictional Coefficients

for Determination of Resistance

By D. W. Taylor*

WHILE present day naval architects are unanimous as to the validity and value of the model tank method of estimating ship performance, which we owe to the genius of Willam Froude, they seem to be of two minds as to the most desirable use of a model tank. Some would use it for pure research into ship resistance, and others would use it only to make accurate estimates of the trial performance of full-sized ships. Since the model tank has reached its present esteem by doing just this latter, it would seem that, certainly from the practical point of view, this is its most valuable function. For either function we need to use frequently the coefficient of friction of the full-sized ship. Froude's coefficients, deduced by rather bold extrapolation from W. Froude's tests of small friction planes, have stood the test of time surprisingly well, and Mr. Baker told us this year that they are still used at the Alfred Yarrow tank. However, most naval architects, both in the United States and England, believe they could be revised to advantage.

In 1924 the Institution of Naval Architects appointed a committee to take up this question. Its report suggested full-scale towing experiments repeating with modern ships Mr. Froude's experiments of 1872 with the little 172.5-foot Greyhound. These experiments have not been made, and in view of their expense I think we may consider it certain that, if ever made, it will be in the distant future.

Of course we have Gebers' friction-plane experiments made at Vienna at 1916-17 (during the World war). Gebers covered much more ground than Froude as to size and speed of planes, but, even so, applying friction-plane results to modern ships requires us to jump, by extrapolation, rather a wide gap.

In discussing Commander Saunders' paper of last year, I suggested a method of deriving indirectly from the progressive trial results of a ship her coefficient of friction.

In deriving estimates of ship shaft horsepower from self-propelled model results, we use the ship coefficient of friction. If then for a given ship we make a number of estimated curves of shaft horsepower, using various coefficients of friction, and compare these shaft horsepower curves with the trial curve of shaft horsepower, it is very easy to determine a ship coefficient which would have made agreement between model tank estimates and ship good enough for any engineering purpose.

D. W. Taylor
Rear Admiral (C. C.), U. S. N., Retired

The shipping board has recently tried out this method and has kindly permitted the results to be included in this paper.

The ship was the Clairton, which, though not a new vessel, has been given two carefully run trials over the Rockland course, one in 1930, and one in 1931. The society's transactions for 1930 and 1932 give the results of these two trials.

A diagram published with this paper (omitted from this article) shows in full lines five curves of shaft horsepower estimated from five self-propelled model trials of the Clairton, and shows also in broken and dotted lines the two actual shaft horsepower curves. As indicated in this diagram, the frictional effective horsepower was calculated by the Gebers' formula using $V^{2.875}$. The five coefficients corresponding to the five full line curves of the diagram were 0.009, 0.012, 0.015, 0.018 and 0.021.

It is evident from the diagram that to have substantially exact agreement between model tank estimates and ship, we should have used for the 1930 trials a coefficient of about 0.0175 and one of 0.0155 for the 1931 trials. These are equivalent to a roughness factor of 1.32 (based on Gebers' constant of 0.013205) for the 1930 trials and 1.17 for the 1931 trials.

These figures would seem to indicate that in the 1930 trials, the Clairton friction was 13 per cent greater than in 1931. Examination of the comparative trial results given in the 1932 transactions of the society indicates that perhaps the propeller efficiency was responsible for the variation in shaft horsepower of the two trials, since the effective horsepower was sensibly constant for both trials.

If the ship frictional values had been calculated by Froude's method, the Froude coefficient would have been 0.00863 and the resulting resistance from

R = coefficient $\times$ surface $\times$ $V^{1.825}$

would have been 24,860 pounds at 11 knots.

Using Tideman's coefficient — 0.009104—and his formula

R = coefficient $\times$ surface $\times$ $V^{1.83}$

we would have obtained a resistance of 25,870 pounds at the same speed.

Using Gebers' constant with roughness factor of 1.17—from the 1931 trials—the resistance would be 23,230 pounds at 11 knots.

The calculations given above, however, do not reflect a true comparison, as the corresponding frictional model resistances are not included. This comparison is given, however, in Fig. 9 of Dr. Schoenherr's paper of the 1932 transactions of the society. Here we find that the resistance, on the basis of Froude, is on the high side, while Gebers is on the low side, but not much.

Our old friend Tideman, who has now been abandoned at the United States model basin for a "modified Gebers," provides a small margin of safety over Froude, a useful fact which I pointed out more than forty years ago when recommending Tideman.

*Paper entitled, *A Method for Estimating Ship Frictional Coefficients*, presented at the annual meeting of the Society of Naval Architects and Marine Engineers in New York, Nov. 16. The author, Rear Admiral D. W. Taylor, CC., U. S. N. (retired), is a past president of the society and former chief constructor of the United States navy. The text matter of this paper has been reproduced in full. The diagram which accompanies the paper as presented to the society has been omitted.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

IN DETERMINING whether a boat was partly at fault for a collision, the question is whether what she did at the times and under the circumstances was reasonable and prudent navigation, it was declared in the case of VELMA BROOKS, 3 Fed. Supp. 766. Where a freighter colliding with a power boat gave a passing signal when the boats were a half mile apart and changed her course in the customary manner, and to a seasonable extent, and stopped her engines when the boats were 500 feet apart, the freighter was not partly at fault because of not changing her course more than she did, nor because of not stopping her engines sooner, it appearing that the collision could have been avoided by proper steering by the power boat.

* * *

WHERE a bill of lading recites that the cargo of Hessian cloth was shipped in good order and condition, and adds, "weight, measure, quality, contents and value unknown," it will not be inferred that the bales' contents were free from moisture; such recital was only proof of the external condition of the bales.—TYMERIC, 3 Fed. Supp. 773.

* * *

WHILE a seaman injured in the service of his ship is entitled to maintenance and cure regardless of the question of any further liability on the part of the ship, such right must be invoked by the seaman in a reasonable manner. He may not refuse proffered medical attention if such proffer is reasonably adequate under the given circumstances and then later claim that he was not properly cared for.—ORISKANY, 3 Fed. Supp. 805.

* * *

IN THE absence of the Jason clause in bills of lading, owners of cargo are not liable in general average for expenses incurred because of a breakdown of the ship's boilers, due to negligence in the operation of the ship. The "Jason clause," let it be explained, is a clause in bills of lading obligating the cargo owners to contribute in general average in cases of danger, damage, or disaster resulting from faults or errors in navigation or in the management of the vessel, her machinery, or appurtenances, provided that the owner shall have exercised due diligence to make the vessel in all respects seaworthy, and to have her properly manned, equipped, and supplied. Where a vessel on sailing was not seaworthy as to her pumps, and the owner had not exercised due diligence to make the vessel seaworthy in that respect, the Jason clause never became binding, and the cargo owners were not obligated to contribute in general average for towage expenses resulting from negligent salting of the boilers; the clause was prevented from becoming binding, irrespective of the causal connection between unseaworthiness and danger, damage, or disaster that resulted in loss.—Merklen v. Johnson & Higgins, 3 Fed. Supp. 897.

* * *

FERRY owners owe a nondelegable duty to passengers on the ferries to furnish seaworthy vessels. A carrier owes to his passengers a higher degree of care than a master owes to his servants; he must observe the utmost caution characteristic of very careful, prudent men and exercise extraordinary vigilence aided by the highest skill. In the case of Henson v. Fidelity & Columbia Trust Co., 3 Fed. Supp. 950, it was held that mere visual inspection of a chain made by a blacksmith and which broke when a truck was being driven off the ferry was not the exercise of reasonable care by the ferry owner.

* * *

UNDER the general maritime law a seaman cannot recover damages for injuries sustained through the fault of an officer in ordering insufficient number of men to take in a mooring wire. Prior to the merchant marine act, a seaman could not recover indemnity for injuries resulting from negligence of the master or crew. Seaworthiness within the rule for determining a seaman's right to indemnity for injuries, comprehends the providing of an adequate and competent crew, and it has always been the rule that a seaman who suffers personal injuries from unseaworthiness may recover damages. But the fact that the chief officer was negligent in ordering too few available men to take in the mooring wire did not render the ship unseaworthy as the basis for the recovery of indemnity by the injured seaman.—MAGDAPUR, 3 Fed. Supp. 971.

ONE item of a traffic circular, it was shown in the case of Galveston Wharf Co. v. Phillips, 4 Fed. Supp. 248, prescribed certain dockage charges for all vessels handling import or export cargo, except as provided in other items, one of which fixed certain charges, commencing 24 hours after completing discharge of cargo, on vessels not loading outward cargo, so long as berthed at wharf or mooring or made fast to vessels so berthed. Under this circular, it was held that a steamship agent, contracting for dockage of a steamship, which sailed immediately after discharging her cargo, without taking outward cargo, was not liable for dockage charges.

* * *

A CHARTERER of a tug, unseaworthy because of having an insufficient crew, it lacking a deck hand, who had missed the boat, was held liable to the cook who was injured while acting as a deck hand. The owner and charterer, not in privity with the master navigating the boat, could limit liability to the injured cook to the value of the boat, plus accrued freight.—Scheffler v. Moran Towing & Transporation Co., 4 Fed. Supp. 255.

* * *

STEAMER, operated in a reasonably careful and customary manner, was not liable for damage caused to a boat by swells from the steamer, it was held in the case of JIM AND BILL, 4 Fed. Supp. 258, it appearing that the damage was due to the improper and unseaworthy manner in which the boat was moored.

* * *

NO RULE or law of navigation, said the court in the case of DRAYTON THURSTON, 4 Fed. Supp. 58, requires a boat on Buffalo river to navigate on the starboard side of the channel. The statutory rules for navigating inland waters are not applicable to the Great Lakes and their connecting and tributary waters. The speed of a vessel in a river must be regulated according to the width of the channel, usual traffic conditions, and unexpected emergencies. The test whether speed of a vessel on a river is moderate under the circumstances is whether the speed is such as to allow the vessel to comply with the duty imposed upon her.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	270	1,481,453	251	1,406,668
September	269	1,663,403	277	1,633,829
August	277	1,656,291	280	1,676,614
July	270	1,477,769	256	1,397,794
June	249	1,482,801	264	1,580,337
May	255	1,573,337	244	1,513,231
April	232	1,330,774	232	1,311,863
March,	243	1,466,812	264	1,536,778
February	237	1,373,856	236	1,380,867
January, 1933	254	1,416,857	245	1,383,630

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	68	186,588	51	152,700
September	65	182,418	44	126,290
August	61	181,283	61	178,894
July	69	203,042	53	151,781
June	51	152,234	54	149,616
May	58	157,704	49	141,334
April	63	193,946	41	131,990
March	60	192,817	43	141,445
February	38	105,262	20	56,395
January, 1933	53	154,823	41	142,216

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	96	335,488	60	210,010
September	110	348,981	80	279,531
August	129	453,348	101	329,686
July	124	410,500	96	379,721
June	118	378,179	93	303,239
May	111	295,854	83	254,667
April	86	271,864	69	226,862
March	85	259,203	65	240,768
February	83	285,162	53	191,084
January, 1933	97	329,575	56	211,428

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	14	27,953	14	32,913
September	15	26,225	12	28,028
August	16	28,877	18	32,727
July	11	24,324	9	23,063
June	11	24,615	12	26,271
May	13	19,020	13	23,395
April	5	9,254	5	7,387
March	9	24,186	10	23,989
February	19	52,001	19	48,913
January, 1933	14	35,038	13	34,153

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	4	13,606	4	9,730
September	2	4,430	5	13,279
August	6	11,862	4	10,186
July	3	6,171	2	9,465
June	6	16,192	2	4,437
May	3	10,490	3	3,834
April	8	30,156	2	5,650
March	4	17,052	....	.....
February	7	27,520	1	4,393
January, 1933	2	7,473	1	3,171

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
September, 1933	25	97,576	38	141,839
August	22	83,506	34	129,908
July	26	99,339	29	111,559
June	20	78,651	34	120,089
May	25	98,688	28	105,115
April	17	67,220	24	97,104
March	20	79,537	43	162,970
February	25	97,554	34	130,014
January	24	95,271	33	138,372
December	22	92,267	41	166,858
November, 1932	19	78,628	41	157,544

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	88	284,997	90	289,864
September	85	273,994	84	270,189
August	95	299,114	98	307,841
July	91	272,589	90	282,788
June	65	205,724	71	240,487
May	79	237,046	78	229,333
April	63	198,940	58	178,957
March	72	228,806	72	223,594
February	63	195,299	75	226,672
January	77	247,903	78	252,052
December, 1932	75	238,598	68	224,544

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	8	18,873	38	83,525
September	10	24,615	24	53,036
August	8	16,472	34	68,011
July	16	32,370	34	71,798
June	16	30,163	31	60,544
May	18	33,521	32	68,941
April	14	39,010	36	100,485
March	18	56,097	42	111,038
February	16	49,213	36	82,544
January, 1933	20	58,470	33	76,493

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	11	24,365	6	8,893
September	8	11,528	7	13,086
August	7	12,477	7	13,152
July	13	22,553	11	25,670
June	9	22,192	6	12,222
May	5	13,102	9	16,275
April	3	8,297	8	20,260
March	7	18,536	9	18,137
February	6	15,126	7	13,454
January, 1933	3	4,683	8	21,018

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	22	37,180	23	39,878
September	22	38,648	23	38,659
August	18	33,210	18	32,716
July	24	39,400	22	37,180
June	27	40,569	27	42,160
May	41	55,097	39	59,075
April	41	50,121	35	47,458
March	42	57,720	39	54,508
February	37	52,615	34	49,320
January, 1933	38	55,322	38	54,692

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	118	247,474	124	297,436
September	116	265,547	113	266,183
August	100	223,940	102	203,716
July	110	221,610	114	236,622
June	97	206,147	91	183,736
May	95	210,743	105	231,000
April	105	209,469	109	235,429
March	96	234,328	91	206,064
February	80	184,669	83	200,850
January, 1933	100	232,451	91	201,671

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	176	618,298	165	572,714
September	151	496,684	149	513,291
August	183	604,618	161	573,703
July	166	545,372	169	554,228
June	36	160,127	36	157,887
May	37	149,245	38	164,025
April	41	188,899	40	180,517
March	47	194,485	51	216,803
February	43	196,979	43	190,338
January, 1933	50	212,954	49	210,083

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	154	467,332	169	506,324
September	154	443,981	168	470,271
August	144	420,570	151	429,183
July	169	468,111	184	493,775
June	147	422,280	146	422,235
May	150	444,982	151	434,952
April	142	409,411	154	416,833
March	161	464,728	161	457,880
February	128	378,040	127	366,948
January	135	307,750	145	410,412
December, 1932	151	434,935	157	450,545

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	34	97,585	33	91,526
September	42	116,048	32	83,944
August	33	92,987	27	76,881
July	35	102,115	29	82,742
June	32	84,362	28	75,023
May	21	53,125	20	49,888
April	19	49,280	20	52,449
March	35	99,612	29	83,243
February	24	65,228	24	65,218
January, 1933	28	83,545	23	65,063

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	21	44,388	104	304,402
September	10	19,602	94	277,642
August	19	44,012	69	205,442
July	22	33,718	77	213,821
June	27	56,231	79	227,842
May	27	58,632	86	261,124
April	27	64,360	73	215,020
March	19	34,677	83	239,683
February	17	29,935	69	200,485
January	23	43,723	79	235,748
December, 1932	24	39,491	103	311,999

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	160	623,572	152	592,212
September	154	562,597	152	561,294
August	156	578,255	156	605,610
July	165	641,116	152	601,731
June	189	670,782	171	671,704
May	190	600,184	185	630,905
April	178	625,508	190	614,741
March	152	550,205	167	599,191
February	143	528,613	155	543,628
January, 1933	162	633,944	169	668,576

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	169	753,650	168	717,133
September	150	654,888	141	658,887
August	174	748,739	170	743,918
July	156	710,857	154	717,664
June	162	715,236	162	738,436
May	160	717,412	161	680,493
April	138	733,163	150	652,593
March	145	667,902	156	693,893
February	145	658,005	144	621,439
January, 1933	154	672,230	147	657,934

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
October, 1933	28	105,818	41	151,872
September	20	70,827	27	89,893
August	22	91,240	31	117,641
July	33	122,722	40	153,173
June	28	96,996	34	118,058
May	32	127,718	43	164,896
April	20	80,016	29	103,049
March	16	71,995	28	101,486
February	20	71,711	28	95,755
January, 1933	19	72,798	33	110,421

Note: At the port of Philadelphia, additional vessels in the foreign trade in this category were 73 of 246,658 net tons entered and 77 of 253,449 net tons cleared for the month of October.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

IT IS understood that the Standard Vacuum Transportation Co. on about Nov. 16 received bids for the construction of three new tankers of canal type and that United Dry Docks Inc., New York, was the low bidder. No information is available as to the cost or that the order has been definitely awarded, but it is expected that the United Dry Docks Inc. will receive the contract to build these vessels.

If the new tankers are to be generally similar to the tanker NEW YORK SOCONY, as it is believed they are to be, they will have the following characteristics:

Length overall, 263 feet, 2 inches; length between perpendiculars, 262 feet; breadth molded, 45 feet, 6 inchs; depth molded, 15 feet, 6 inches; draft molded, 12 feet, 3 inches; displacement loaded, 3143 tons; gross tonnage, about 1500; the Sea speed will be about 9 knots. They will be propelled by two direct connected diesel engines. The total horsepower in the two engines will be about 700. Cargo capacity will be about 700,000 gallons.

It is understood that it is planned to build two of these tankers using regular riveted construction and the third of a combination of riveted and welded design. N. J. Pluymert is naval architect, of the Standard Vacuum Transportation Co.

Bids on Harbor Cutters

On Nov. 14 the United States coast guard received bids as follows for the construction of four harbor cutters. The bids given are for each boat in lots of two and four respectively:

Consolidated Shipbuilding Corp., Morris Heights, N. Y., [illegible]175 and $257,741; Dravo Contracting Co., Pittsburgh, $294,000 and $279,000; General Engineering & Dry Dock Co., Oakland, Calif., $306,162 and $298,715; Wallace Bridge & Structural Steel Co., Seattle, Wash., $264,150, and no bid for four; Spedden Shipbuilding Co., Baltimore, $284,125; Southern Shipyard Corp., Newport News, Va., $300,000 and with Winton engines $303,500, no bids on four; National Shipbuilding Co. Inc., Portsmouth, Va., $301,000, and with Winton engines, $301,500, with no bid for four. Estimates were also given by the Charleston navy yard, Charleston, S. C., of $245,153 and $235.953; Boston navy yard, $316,188 and $299,584 with 100 per cent pay, also $296,557.02 and $281,726.38 with 85 per cent pay.

From this it is apparent that the Consolidated Shipbuilding Corp. is the low bidder. No award has been made as this is written.

The cutters are of steel construction; length overall 110 feet, 6 inches; beam molded, 24 feet; depth molded, amidships, 12 feet, 7 inches; draft maximum, about 10 feet, 6 inches; displacement, full load, about 290 tons. They are to be propelled by single screws with diesel electric machinery of about 800 shaft horsepower.

Ferryboat Is Launched

On Nov. 2, the steel ferryboat DELMARVA was launched at the shipyard of Pusey & Jones Corp., Wilmington, Del. This new vessel is under construction for the Virginia Ferry Co., a subsidiary of the Pennsylvania railroad. The cost of this ferry will be approximately $600,000.

The new vessel, which will enter service between Norfolk and Cape Charles, is 265 feet in length and 59 feet beam. She is said to be fitted with Skinner una-flow reciprocating steam engines and watertube boilers fitted for oil burning. She will have a carrying capacity of 1200 passengers, and will also have special facilities for accommodating trucks, buses and automobiles.

The new ferry was named DELMARVA in honor of the three states Delaware, Maryland and Virginia. The sponsor was Miss Elizabeth Jane Hankins of Philadelphia, daughter of F. W. Hankins, chief of the motive power division of the Pennsylvania railroad. Several hundred guests witnessed the ceremony.

Submarine Machinery Bids

On Nov. 1 bids were opened for furnishing propelling machinery for submarines Nos. 172 and 173 to be built at the United States navy yard, Portsmouth, N. H., and Nos. 174 and 175 to be built by the Electric Boat Co., Groton, Conn. In the bids submitted, delivery of the machinery was to be in eight, nine, ten and eleven months, respectively, from the receipt of order.

The Winton Engine Corp., Cleveland, was the low bidder in the sum of $3,823,308, and it is understood, has been awarded the contract. The other bids were as follows: Electric Boat Co., Groton, Conn., $3,995,000; Elliott Co., Ridgeway, Pa., $4,057,000; General Electric Co., Schenectady, N. Y., $3,860,000; and Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., $3,954,098.

Northwest Yards to Bid

Pacific coast yards are preparing to submit bids for the construction of seven patrol boats for the Alaska Game commission and the United States Biological survey under the federal public works program. It is understood that $184,700 has been allotted for this purpose.

Plans are being prepared for a tender for the United States Public Health service for use on Puget sound. This is one of eight similar vessels the service has in mind. Bids will be invited within 30 days, it is understood.

The Winslow Marine Railway and Shipbuilding Co., Winslow, Wash., was low bidder at $2104 for building a small tender for the lighthouse department for use in local waters.

To Build Tanker

On Nov. 21 it was reported that the Atlantic Refining Co., Philadelphia, would soon issue specifications for the construction of a new coastwise and canal tanker of about 200 feet in length. This vessel is to be self-propelled and presumably the power will be either direct diesel or diesel electric drive. The specifications, it is understood have been prepared by Lester M. Goldsmith, consulting engineer of the company.

It has been reported that the shipping board bureau of the department of commerce has refused to sanction a construction loan to the Gulf Pacific Mail line for building the combination passenger and cargo vessel on which bids were recently received. The building of the vessel, it is said, has, therefore, been postponed indefinitely.

First Arcform Vessel is Launched in England

The first of three cargo ships built on the new arcform principle, developed and introduced by Sir Joseph Isherwood, was launched on Nov. 2 at the Sunderland shipyard of Short Bros. Ltd., in England. She was christened the ARCWEAR by Lady Isherwood. The entire world will watch with great interest the performance of these vessels in service. The new hull form was decided upon after much research and many tank experiments in order to attain minimum resistance to propulsion while at the same time improving the carrying and seaworthy properties of the most modern ships. With this form it is possible to carry a greater deadweight on given dimensions.

The other two vessels of the group are the ARCTEES, building at the Furness Shipbuilding Co., Ltd., Haverton Hill-on-Tees, and the ARCGOW building at Lithgows Ltd., Port Glasgow, in Scotland.

The confidence of Sir Joseph Isherwood in the possibilities of his new design is illustrated in the remarks he made at the launching of the ARCWEAR when he said:

"I fully expect to show that a 1000-foot liner having a speed of 35 knots and more is within the range of commercial practicability with economical fuel consumption."

The principal dimensions of the ARCWEAR are: length between perpendiculars, 360 feet; beam extreme at load water line, 57 feet, 6 inches; depth molded, 26 feet, 9 inches; draft, 22 feet, 7 inches; and deadweight, 7000 tons.

Propelling machinery consists of a triple expansion steam engine with cylinders 21½ x 37 x 62 inches in diameter, stroke of 42 inches. and poppet valves for the high pressure cylinder. Steam is supplied by two Scotch boilers, 13 feet, 6 inches in diameter. by 11 feet, 6 inches in length, operating on forced draft; also one auxiliary boiler, 12 feet by 10 feet, 6 inches. All the boilers are operated under working pressures of 220 pounds per square inch. Superheaters are fitted for the two main boilers, and the total temperature is 630 degrees Fahr.

Estimates indicate that these ships will do 11 knots on 21 tons of coal a day, 10 knots on 16 tons, and 9 knots on 11½ tons. If these estimates are confirmed on the trials, as it is confidently expected they will be. it will mean that this type of vessel can operate on from 25 per cent to 50 per cent compared with many ships afloat today. The vessels are being built to the highest class in Lloyd's Register of Shipping.

Among other new features of the ARCWEAR and also the other two, are the special type of Isherwood steel covers for the hatches. These covers are fitted with a locking device. which makes it impossible to uncover the hatches by accident even in the severest weather.

Bids on Lighthouse Tenders

The lighthouse service of the department of commerce will open bids in Washington on Nov. 24 for the construction of two new lighthouse tenders. The larger of these, to be known as the HOLLYHOCK, is to be a twin screw, steel hull, steam propelled vessel, of 174 feet in length. She is to have oil burning water-tube boilers and steam reciprocating engines of 1000 horsepower. The other tender, to be known as the TAMARACK, is to be a steel hull, single screw, diesel electric propelled vessel, 124 feet in length.

Both vssels are to be used on the Great Lakes, the HOLLYHOCK in the twelfth lighthouse district, Lake Michigan, and the TAMARACK in the more sheltered waters of the eleventh lighthouse district, principally in the waters of St. Mary's river between Lake Superior and Lake Huron. The horsepower of the Tamarack in two diesel engine generators and electric motor drive will be about 450.

The Manitowoc Shipbuilding Corp., Manitowoc, Wis., submitted a low bid of $236,417 for building the TAMARACK, and the Berg Shipbuilding Co., Seattle, submitted a low bid of $377,000 for building the HOLLYHOCK.

Contracts are Awarded for Nine Patrol Boats

On Nov. 4 the United States coast guard announced the award for the construction of nine patrol boats as follows:

Contract has been awarded to the Lake Union Dry Docks and Machine Works, Seattle, Wash., for the construction of three (3) 165-foot patrol boats at a cost of $236,253 for each boat.

Contract has been awarded to the Manitowoc Shipbuilding Corp., Manitowoc, Wis., for the construction of three (3) 165-foot patrol boats at a cost of $242,800 for each boat.

Contract has been awarded to the Marietta Mfg. Co., Point Pleasant, W. Va., for the construction of three (3) 165-foot patrol boats at a cost of $248,210 for each boat.

Each of the above bids and awards are based on the use of Winton diesel engines.

These patrol boats have the following characteristics: Hull of steel construction; length overall, 165 feet; beam molded, 25 feet, 3 inches; depth molded, amidships, 13 feet; draft maximum, 8 feet, 6 inches; displacement fully loaded, 337 tons; propelling machinery, twin screw; diesel engines, direct connected, of 1300 total estimated shaft horsepower.

The first vessel is to be completed in 300 calendar days after official notice of award is received and subsequent vessels are to be deliverd at intervals of not more than 20 calendar days.

A number of other yards entered bids. Some bids included the choice of other makes of engines. The bids varied from the amount of the successful bidders to as much as $324,-450; most of the bids, however, were well under $300,000.

On Nov. 15, the keel was laid for the heavy cruiser QUINCY at the Fore river shipyard, Quincy, Mass., of the Bethlehem Shipbuilding Corp. The new cruiser is scheduled to be completed in 1936

Bunker Prices

At New York

	Coal F. o. b. per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Nov. 18, 1933	5.35@5.20	1.15	4.70½
Oct. 18	5.00@5.75	1.15	4.70½
Sept. 18	4.45@4.75	1.15	4.70
Aug. 18	4.45@4.75	.90	4.32
July 18	4.30@4.60	.90	4.32
June 18	4.30@4.60	.80	4.08
May 18	4.30@4.60	.80	4.08
Apr. 18	4.30@4.60	.80	4.08
Mar. 18	4.30@4.60	.80	4.08
Feb. 18	4.30@4.60	.80	4.08
Jan. 17, 1933	4.50@5.00	.80	4.08

At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Nov. 18, 1933	4.65@4.50	1.15	4.76
Oct. 18	5.00@5.75	1.15	4.76
Sept. 18	4.45@4.75	1.15	4.88
Aug. 18	4.45@4.75	.90	4.28
July 18	4.30@4.60	.90	4.28½
June 18	4.30@4.60	.80	4.04
May 18	4.30@4.60	.80	4.04
Apr. 18	4.30@4.60	.80	4.04
Mar. 18	4.30@4.60	.80	4.04
Feb. 18	4.30@4.60	.80	4.04
Jan. 17, 1933	4.50@5.00	.80	4.04

Other Ports

Nov. 18, 1933

Boston, coal, per ton	$11.33
Boston, oil, f. a. s. per barrel	$1.26½
Hampton Roads, coal, per ton, f.o.b. piers	$5.00
Cardiff, coal, per ton	13s 9d
London, coal, per ton	—s —d
Antwerp, coal, per ton	17s 0d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	87s 6d
British ports, Diesel oil	102s 6d

Note: Figures given for coal at New York and Philadelphia are for Classes A and B according to the Code; Class C is slightly less.

Equipment Used Afloat and Ashore

Truck Power Unit—Pipe Clamp—Centrifugal Pump—Foam Generator—Thermostat—Dual Ventilating Motor—New Type of Union

A COLLOIDAL-GRAPHITED lubricant has been developed by the Acheson Oildag Co., Port Huron, Mich. for lubrication of devices subjected to high temperature. The graphoid surface, formed with the use of colloidal-graphited lubricant possesses a low coefficient of friction, is unusually resistant to oxidation, and forms a protective coating on the friction part.

The ideal lubricant for high temperature work is one which "stays put," resists oxidation and is capable of retaining its lubricating properties under extreme conditions of temperature and pressure. Electric-furnace graphite colloidally dispersed in a suitable carrier is said to meet all of these requirements.

New Truck Power Unit

A NEW power unit for industrial trucks has been developed by the Syntron Co., 400 North Lexington avenue, Pittsburgh, Pa. It consists of a powerful industrial type gasoline engine, direct connected to a generator of voltage and amperage corresponding to the power supplied by electric batteries. This truck power unit can be furnished with new trucks or to replace batteries in existing trucks.

The normal capacity rating is 3.6 kilowatts and the maximum overload rating is 13.5 kilowatts. The voltage, as specified, may be 24, 30, 36 or 48 volts. The engine is a four-cylinder industrial type of 3¼-inch bore, and 4-inch stroke. It is direct connected to a compound wound, constant potential direct current generator, which supplies the current for the electric driving motor of the truck. The combined gasoline engine and generator is housed in a sheet steel covering with removable sliding sections and mounting tray. The dimensions of the complete unit are: length, 40 inches; width, 22 inches; height, 28⅛ inches. The net weight 840 pounds.

Some of the advantages claimed for this particular unit are: continuous power supply; a substantial saving in operating cost; low initial cost; and as full speed and full power are always available, increased tonnage can be handled. In this unit the truck carries its own power generating plant and therefore longer hauls and remote operation are possible. Ability to operate under continuous overload capacity makes it possible for trucks equipped with this unit to operate on 24-hour duty carrying heavy loads on long trips or up steep and long ramps. Due to the care in design and construction the maintenance costs are low. One filling of the five-gallon gasoline tank is sufficient for one full working day of eight hours.

A Pipe Welding Clamp

A NEW pipe welding clamp has been developed by Oster-Williams, Cleveland. This claimp is adjustable for all sizes within its range and is simple in design. For the present it will be made in two ranges, one from 4 inches to 6 inches and the other from 8 inches to 12 inches.

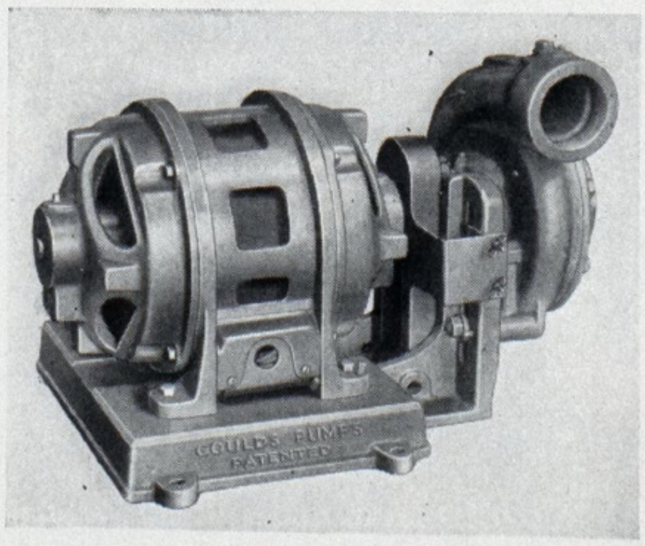
One lever controls the action of the clamp, making it easy to put on and take off the pipe. It automatically centers the two lengths of pipe to be welded, and adjustable screw spacers keep them the correct distance apart for efficient welding. The pipe is held rigidly and the open construction of the clamp leaves ample space for tacking. The smaller clamp weighs 18 pounds and the larger 26 pounds.

Centrifugal Pumping Unit

COMPACTNESS, high efficiency, and low cost have been combined in the motor-centrifugal pumping unit recently developed by Goulds Pumps Inc., Seneca Falls, N. Y. A new close-coupled type of mounting is used which permits standard drive motors without special bedplates and brackets. The pump bedplate extends under the motor, as can be seen in the accompanying illustration, thus relieving the motor of excessive strain.

These pumps are built in sizes from ¾-inch to 4 inches, for capacities up to 1000 gallons per minute. Heads range from 10 feet to 290 feet. The company has issued a complete description with a comprehensive selection chart for both 1750 and 3550 revolutions per minute speed.

The applications of these new pumps to the marine field are many and varied. The impeller is of the open warped vane type with passages considerably larger than in the corresponding size of enclosed impeller. This permits handling of liquids which cannot be handled readily with enclosed impellers. A properly designed pressure equalizing plate cast integral and machined with the impeller compensates for the end thrust.



New motor-centrifugal pumping unit

Electrocoated Abrasives

ELECTROCOATED abrasives, said to be of unusually high efficiency and suitable for shipyard use and in maintenance work on shipboard, have recently been developed by the Armour Sand Paper Works, Behr-Manning Corp., The Carborundum Co., and Minnesota Mining & Mfg. Co. These new sandpaper products are said to last longer and to turn out a superior class of work on all such jobs as cleaning metal plates, removing weld beads, preparing surfaces for paint, smoothing bearings, polishing metal work, and surfacing wood. On a variety of work the makers claim that there is an average increase in efficiency of between 30 and 40 per cent.

These advantages are due to a recently perfected process of manufacture, which makes use of a high tension electro-static field for setting the abrasive granules securely in the adhesive on the cloth or paper backing. The electro-static force first arranges all particles so that their long axes are parallel and so that the distance between them are all approximately equal. It next shoots them at high velocity into the adhesive, where they appear with all points facing outward. In this way the sharp points of all grains, which number as high as 35,000,000 per square inch on the finest varieties, are effective cutting tools, and the surface of the coated abrasive is uniform.

Electrocoated abrasives will be placed on the market in the many styles, kinds and shapes needed for carrying out the thousand and one operations in which this tool of the modern industrial world has become a necessity.

For Extinguishing Fire, A New Foam Generator

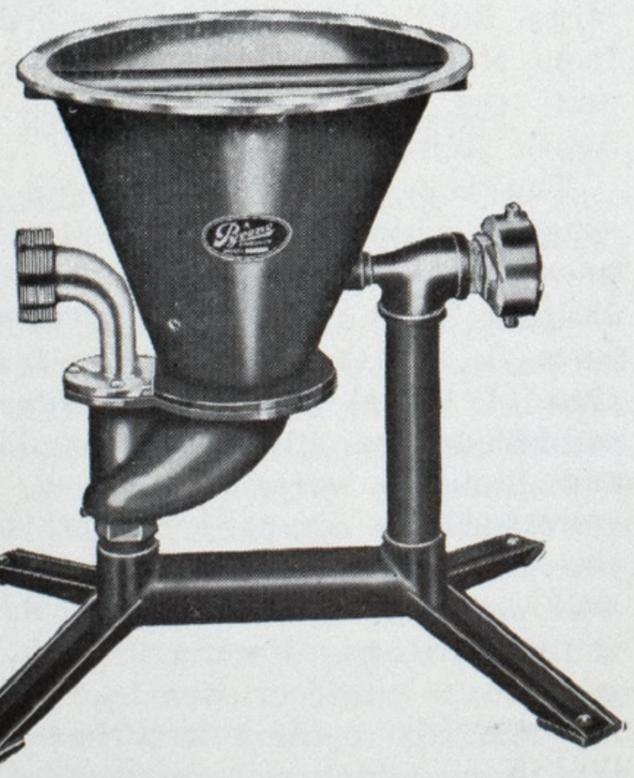
A CONTINUOUS foam generator embodying new ideas of design and construction has been developed by The Pyrene Mfg. Co., Newark, N. J., after extensive experimentation and practical testing. It possesses unusual simplicity, sturdiness and efficiency in operation.

The new device is a hopper for converting a fire line from a continuous water stream to a continuous foam stream. The unit is coupled into a hose line. Water enters at one side. A special material known as "phomene" powder is poured in the hopper and foam is discharged through the hose line at the other side of the unit. The inlet and outlet are shown in relation to the hopper in the accompanying illustration. It is designed especially for services wherever quantities of flammable liquids are used or stored. Water, of course, is not satisfactory because it does not extinguish such fires and causes "boilovers," overflowing and the spread of fire. The foam blankets burning liquids and solids and smothers the fire quickly.

The unit is suitable for marine service. It can be used on board ship and for the protection of waterfront properties. It produces a durable, free-flowing foam which is the finest extinguishing medium for inflammable liquids, such as gasoline, oils, solvents, and other extra hazardous materials. The fact that this foam is free flowing also makes it efficient in ordinary combustible fires and it penetrates and quickly smothers fire in paper, rubbish and the like. The new hopper can be used with fresh or salt water.

Another advantage is that it produces a practically unlimited quantity of foam. As long as there is water and powder a continuous foam stream can be produced. An important feature of this unit is that it operates on water pressure as low as 35 pounds. A powerful auxiliary water jet, an exclusive patented feature, drives the powder at a flow rate proportional to that of the water and assures uniform performance over a wide range of pressures.

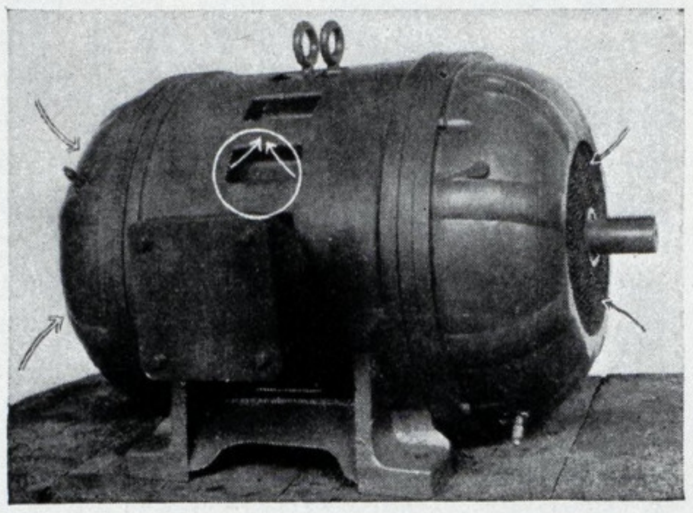
The hopper has no levers, valves, gages or moving parts. It is a complete unit ready for use. There are no parts to be assembled. The base is malleable iron. The hopper and hopper bowl, cast of special composition metal, cannot be bent out of shape. Powder pails can be pounded on a slam bar to empty their contents completely and quickly. In spite of its rugged construction, the unit weighs only 42 pounds and is easily carried in one hand.



Hopper, generating continuous foam

Dual Ventilating Motors

TOTALLY enclosed motors, used in dusty, damp, or hazardous locations, for years were much bigger and more costly for their power than ordinary open motors because of difficulty in cooling. Recently, Westinghouse engineers perfected an ingenious scheme of ventilation which makes possible enclosed motors up to 200 horsepower with mounting dimensions comparable to open types. Internal and external air is circulated by fans through paths which cause rapid transfer of heat from the internal air to the frame and from frame to internal air.



Dual ventilated enclosed motor

The frame contains two sets of ducts. The first set runs from one end of the frame to the other, inside the motor. The internal ventilating air is drawn by the internal fan through the air gap and rotor core vent holes and is driven through the stator and turns and through the internal ducts over the stator core. When the motor is assembled the internal air is effectively sealed within the motor. The second set of ducts alternate with the first and pass from each end to the center of the motor. Double end ventilation is used on the larger machines. The accompanying illustration shows one of these dual ventilated totally enclosed motors.

These motors are especially suitable for driving pumps for, hot oil, gasoline, and for centrifuges and in other locations considered hazardous.

Thermostat Protects Motors Against Overheating

A COMPLETELY self-protecting motor which cannot burn out and yet carries overload just as long as the motor itself is not in danger, has recently been developed by the Westinghouse Electric & Mfg. Co. A small disc type thermostat mounted on the motor frame, opens the circuit when the motor gets too hot and connects it again after the motor has cooled.

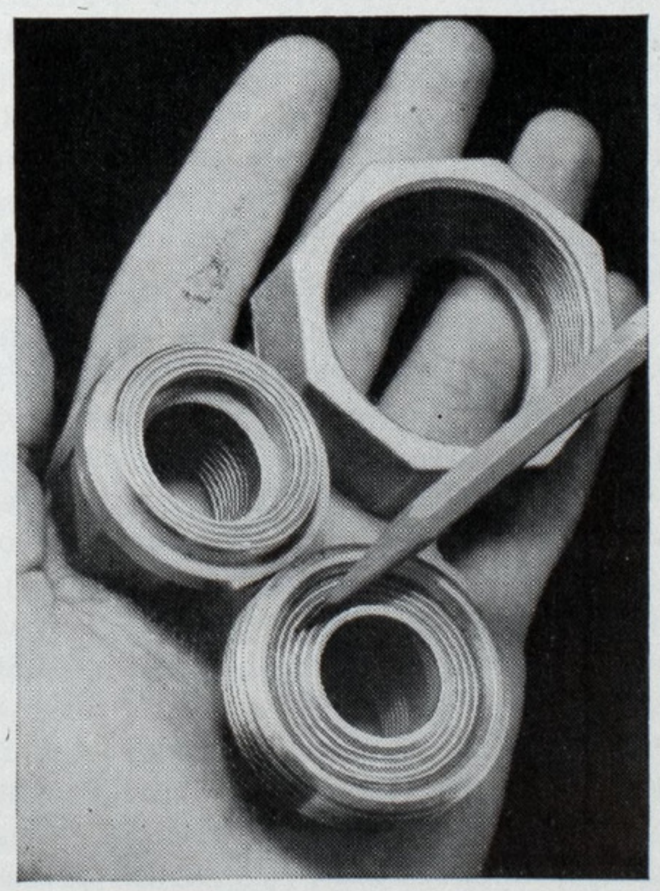
This motor is ideally suited for automatically controlled devices, such as refrigerators, oil burners, etc.

Because the thermostat is arranged to accurately gage the temperature inside the motor, it lets the motor work as long as possible regardless of service conditions but removes it from the line when the temperature approaches a damaging value. The thermostat's operation depends upon a combination of the actual motor frame temperature and the line current through the motor.

A New Type of Union

A BASIC improvement in high pressure union design for steam, oil, gas, water and air lines, is featured in a new product, manufactured by the Mergenthaler Linotype Co. and distributed through its subsidiary, the United Superior Union Co. The improved union will last longer and added protection is given against leaks.

The new union, said to be a distinct innovation from the ordinary "ball" type, has two serrated ends, one hard and the other soft, which form four distinct seats. This gives greater protection against leakage than the single seat of the ball type union. Maintenance is also more economical; the unions can be used a number of times, as a single "making-up" cannot possibly spoil the four separate seats.



A new high pressure union

What Russian Trade May Mean to Shipping

Official recognition of Russia, which took place on Nov. 17, is expected to have a marked effect on our export and import trade. The extent of this trade is estimated at over a half a billion dollars a year. According to former Senator Brookhart, now Soviet advisor to the farm bureau, Russia will need, in the very near future from $50,000,000 to $60,000,000 in new cotton; up to $30,000,000 in livestock products, more than $30,000,000 in cotton textiles, up to $300,000,000 in heavy machinery, and about $100,000,000 in railroad equipment. What this business will actually amount to will depend largely on what financial arrangements may be worked out.

The American Steamship Owners' association point out that so great an interchange of commodities will mean the expenditure of a large sum of money for shipping purposes and that ships of the participating nation have a prior right to this revenue. Since the Russian merchant marine has not yet been developed. to any large degree, the bulk of the purchases should logically go to American ships.

R. J. Baker, secretary of the American Steamship Owners' association, recently issued a statement in which he said in part:

"It is hoped that the carriage of goods between the United States and Russia will be confined so far as practicable to the ships of the contracting parties.

"Because of the nature of the goods to be exchanged by Russia and the United States, transportation may well constitute a goodly percentage of the payments involved. It would be strange economics for our government to finance the exports of a hundred industries without protecting the basic structure upon which foreign trade is built—water transportation. The Russian trade may well mean the salvation of American shipping at a time when shipping, like other industries, is struggling for survival."

E. J. McCormack, vice president of Moore & McCormack, on Nov. 20 announced that plans had been completed to increase the service of the American Scantic line to a sailing every five days with the addition of seven American vessels in the run. Believing that the passenger business between the two nations will grow rapidly officials of Moore & McCormack, operator of the American Scantic line, are considering plans for furnishing additional passenger accommodations on all of the ships in this service, so that capacity will be increased to care for 1000 passengers on the eleven ships. Four of the vessels, the SCANMAIL, SCANSTATES, SCANYORK and SCANPENN which were elaborately reconditioned sometime ago, now operate in this service and can each accommodate about 100 passengers.

The American Export Line, serving Russian Black Sea ports in connection with its regular New York-Mediterranean run, is planning to add twelve American ships, now in layup, to this service in order to handle the increased trade which is anticipated.

Boston Shipping Increases

Substantial increase in the foreign commerce of Boston is shown in the figures for October. During that month, duties collected amounted to $3,415,399.13 compared with $1,800,350.75 for the same month last year. During the four months of the fiscal year, July 1 to Oct. 31, inclusive, the duties collected on imports at Boston amounted to $10,946,843.22, against $7,027,909.65 for the same period in 1932. Imports for the Massachusetts district for the ten months of this year were valued at $19,228,223.88 compared with $15,602,837.84 for the same period in 1932, showing a gain for 1933 of $3,625,386.04.

One of the largest cargoes received in months from South America arrived in the American Republic liner COLDBROOK, Capt. J. F. McDougall, at the Army base, Boston, recently from Buenos Aires, Montevideo and Brazilian ports. Nearly 4000 tons of wool, pickled skins, quebracho and 20,000 bags of coffee were unloaded at Boston. The vessel also had 1100 tons for Philadelphia and 1200 tons for New York. Receipts of wool at Boston have been exceptionally heavy during the past six months, although lighter now. A heavy movement of wool is expected beginning with the new year.

The above information on the port of Boston has been received through the courtesy of Frank S. Davis, manager of the Maritime association.

United States engineer office, Chicago, has awarded contract to the Midland Barge Co., Midland, Pa., for the construction of two open deck steel barges, 40 x 14 x 3½ feet, in dimensions, at a total cost of $5236 for both barges.

Bids are to be received at the United States engineer office, 428 Custom House, St. Louis, until Dec. 19 for the construction of twin locks at lock and dam No. 26 on the Mississippi river. Complete specifications have been issued.

Companies Show Profits During This Year

For the month of September the American Hawaiian Steamship Co. showed a profit, before federal taxes, of $149,072, compared with a net loss of $8462 in September, 1932. For October, the profit was $148,742 after charges but before federal taxes. This compares with a profit of $99,270 in October, 1932. The profit for the first ten months of this year amounts to $696,911 compared with a loss of $444,511 for the first ten months of 1932.

The Atlantic Gulf & West Indies Steamship Co. and subsidiaries, for the first eight months of 1933, ending Aug. 31, showed a net income of $513,733 after depreciation, taxes, interests, and rentals. This compares with a net loss of $1,100,972 in the first eight months of 1932.

Wages Are Increased

Wages of longshoremen working at several coastwise steamship terminals at New York have been increased to 75 cents an hour for straight time and $1.10 for overtime. The previous scale had been 67 cents and $1.00 respectively.

Wages have also been increased for members of the International Longshoremen's association employed on the deep water piers. Under the new wage scale agreed to in a contract with the association by the employers, 85 cents an hour will be paid for straight time and $1.20 an hour for overtime. The former rate of pay was 84 cents and $1.10, respectively.

Travel Record Anticipated

W. M. Penick, passenger traffic manager of the United Fruit Co., is looking forward to a record breaking travel season this winter. Plans have been completed to operate a large number of attractive cruises from New York to the West Indies and the Caribbean, Central and South America.

The company's summer and fall season, which closes Dec. 14, has been featured by many capacity sailings by the Great White fleet to ports in the Caribbean. This indication of travel popularity, plus the unprecedented advance in bookings and inquiries already received, has convinced the company that travel to the American tropics this winter will establish new high levels in cruise history. Popularity of the company's guest cruises is attributed primarily to the new turbine electric liners which were made possible by the merchant marine act of 1928.

Shipping Code Hearings to Reconcile Views

Various groups in the shipping industry, several of them having presented proposed codes of fair competition, were represented in Washington on Nov. 9 at a public hearing for a preliminary discussion, presided over by W. H. Davis, deputy administrator in charge of marine codes. Much difference of opinion developed as to the possibility of all these groups coming in under one central code and on the subject of rate fixing. Continued study of and possible modification of the terms of the codes submitted, both by the administrator and shipping representatives, was found to be necessary.

After an informal conference with intercoastal carriers in Washington Nov. 20, Mr. Davis planned to attend a conference in New York on November 22 with representatives of American and foreign lines for the purpose of discussing the development of a code for this division of the industry. He was also to confer with representatives of the Lake Carriers association. Joseph Scott, well-known shipping man and former head of the Transmarine lines, is acting as assistant deputy administrator. Conferences are also being held in New York with representatives of ship operators engaged in coastwise, gulf and Porto Rican trades. Tanker interests will also hold meetings with the deputy administrator while he is in New York.

As the matter of a code or codes for the shipping industry now stands, progress can be reported but more time and further negotiations must be carried out before anything definite is decided upon. It is a very complex problem and requires serious and prolonged consideration. This is now being given and something workable and of benefit to the industry will undoubtedly result in the shortest possible time necessary to work out the details.

A Marine Department

Combustion Engineering Co. Inc., 200 Madison avenue, New York, on Nov. 21 announced the formation of a marine department. Commander Horace T. Dyer has been appointed manager. This department will take over the work hitherto handled by the marine division of the company's subsidiary, the Hedges-Walsh-Weidner Co., and will provide a complete service to the marine field in connection with the company's sectional header, bent-tube and other types of boilers and related equipment.

Commander Dyer graduated from the United States Naval academy in 1907 and served in the engineering branch of the navy until his resignation in 1923. Subsequently he was chief engineer of Peabody Engineering Co., and for the past three years has been associated with Gibbs & Cox, naval architects and marine engineers.

James S. Malseed, marine representative, of the Hedges-Walsh-Weidner Co. at Washington, will continue as marine representative of Combustion Engineering Co. Inc., with offices in the Mills building, Seventeenth street, at Pennsylvania avenue.

Eastern Sales Manager

Hugh L. Rusch who joined the organization of the Northern Pump Co., Minneapolis, a year and a half ago, has been elected vice president of the company and appointed eastern sales manager, according to an announcement received from John B. Hawley Jr., president and general manager. Mr. Rusch was formerly supervisor of the technical data section and of the performance report section with the Johns-Manville Corp. Prior to that time he was eastern district manager for Arthur C. Nielsen Inc. He is a member of the American Institute of Electrical Engineers and of several fraternities.

Northern Pump Co., manufactures a broad line of precision built rotary pumps in capacities from one gallon per hour up to 5000 gallons per minute, and for pressures up to 4000 pounds per square inch. In the East, the company has offices in New York, Philadelphia, Boston, Pittsburgh and Buffalo.

Mr. Rusch will be located at the eastern headquarters of the Northern Pump Co., in the Chrysler building, New York City.

Hugh L. Rusch
Vice President, Northern Pump Co.

Mail Pay Investigation By Senate Committee

The senate committee, investigating mail contracts, has continued to hold meetings during the past month in its efforts to develop informaton concerning the operation of steamship lines holding mail contracts. Much of the testimony brought out has had to do with the compensation in salaries and returns on stock holdings of the heads and other prominent personnel of the various lines, the inference to be drawn being that such compensation was excessive, considering the circumstances.

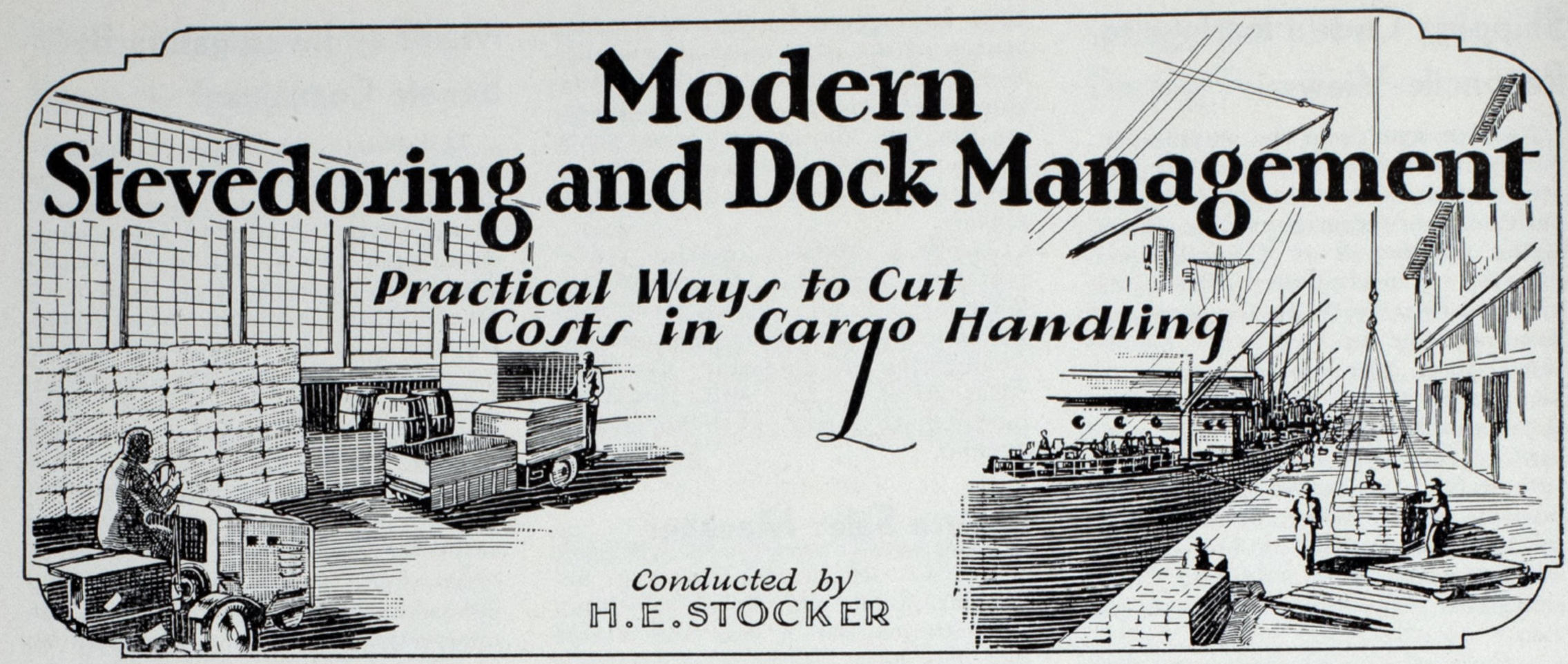
Another very definite matter stressed by the committee is the operation of subsidiary stevedoring companies and the rates paid.

It will be necessary to await the completion of the inquiry before it is possible to evaluate the information brought out. It was, however, evident in connection with the investigation of the South African and West African lines that the committee will study ways and means of maintaining shipping. The whole tenor of the investigation has taken on a friendlier tone. This was particularly noticeable in the later hearings on the Colombian and South African lines. Heads of both lines because of their frank and sincere testimony did much to create an atmosphere of better feeling.

President Roosevelt's recent statement that perhaps the best way to give the support to shipping which every one recognizes as necessary will be to work out some basis for straight subsidy instead of hiding aid to shipping under the cloak of mail contracts and thus confusing the issue.

In this connection it is interesting to note that Secretary of Commerce Roper has appointed a subcommittee on shipping for the business planning council. This committee is to study the general shipping situation and will make recommendations for operations of the shipping board bureau of the department of commerce. This sub-committee on shipping includes, James A. Farrell, Joseph T. Lykes, Roger D. Lapham, C. D. Mallory, Thomas A. Scott, Dr. S. S. Huebner. Henry H. Heimann, permanent secretary of the business planning council is chairman of this sub-committee.

Among shipping men it is strongly felt that a definite policy should be developed which would have the tendency of removing the widespread uncertainty and confusion now existing which is detrimental to a well ordered and permanent development of an efficient American merchant marine.



Co-ordinate Ship and Dock Facilities to Give Profitable Operation

By H. E. Stocker

FAILURE to give proper attention to the fundamental economic principles of marine transportation, lack of thorough analysis to get all pertinent facts and confusion of objectives have lead to mistakes in ship design and operation which have been very costly. Recently the author had a talk with a shipping man about cargo handling methods. The executive stated that his objective was the most effective transportation system. The author contended that this was unsound, both from the point of view of a business man when the objective should be profit and the statesman when the objective is the most effective transportation system for the general economic welfare of the nation.

Costs Must Be Reduced

All business men are interested in profit, although some have concurrently other objectives, such as bigness; the biggest shipping company or the biggest ship or the fastest ship. While every man had a right to determine his own objective in business in the pioneer era of American economic life, under the present era it appears that the major objective is to do business at a legitimate profit. Sweat shop methods, child labor and other socially destructive practices are eliminated. In the shipping business many unfair practices will be eliminated, and the compensation of labor increased. This throws a greater burden on any management regardless of how enlightened it may be.

Therefore, to make a fair profit, possibly even to exist, management must make strenuous efforts to reduce costs, particularly cargo handling costs which next to capital charges are bound to be the highest costs of a shipping company.

In the conversation referred to the author contended that the best objective of a business man is legitimate profit, the best objective of business in general is economic welfare, attained by helping business men make a profit, by stopping unfair practices etc. The author contended that the best objective in the trade route under discussion was the handling of cargo between the ports at the maximum profit.

The objective is to transport cargo between two ports at the minimum of capital investment and to make the maximum of profit on each dollar invested. This theoretical objective is obtained by combining economical operations with good traffic management. The fact that a steamship company may be making a profit, does not prove necessarily that its operations are economical or more economical than those of a company which is operating at a loss. High operating costs in the first case may be more than offset by the work of an excellent traffic department. The author has seen opportunities for profit overlooked because the chief executive was "interested only in the figure at the bottom of the page." If he had analyzed the other figures thoroughly he would have disclosed thousands of dollars which were being wasted in uneconomical pier operations and in other excessive costs. When one of these executives was later superseded by a new man, much of the uneconomical operations were corrected by changes in organization and management policies.

Some executives state that an effective transportation system should be attained by a new design of ship. The author contends that it is sounder business and sounder national economics to first find out the most economical handling of cargo possible by modernization of present type ships, terminals and cargo handling methods. New ships must ultimately be built and these will probably be radical in design, but first make the best possible use of the ships now in operation.

The same is true of terminals. Cargo handling equipment can be supplanted more economically since so much of it can be utilized at other terminals, or it can be replaced by better suited equipment which will pay off the investment in a few months. Some radical changes in *method* of operation may be made at little or no capital investment.

Tow to Reduce Port Time

The ordinary type cargo ship can decrease port time, by utilizing night time hours for handling cargo. One coastwise line cuts time by discharging at night and loading the next day. There are separate night gangs regularly employed at 5 cents an hour more than the day gangs. Where regular

night gangs are not practical, working the day gangs part of the night will speed the dispatch of the ship and within reasonable limits the overtime is more than offset by other advantages. The advantages of this practice is increased when the ship gains time enough to load or discharge at other berths and yet keeps its schedule.

Cargo handling costs can be reduced and cargo carrying capacity of ships increased by greater utilization of deck space. The most effective use of deck space at the moment is in carrying containers on deck. Although this has not been tried, there is no logical reason why it should not prove satisfactory in many cases.

Some cargo can be carried on deck successfully by simple precautions for the protection of the cargo from the elements. One reason why deck space is not utilized more is that cargo stowed on deck has been damaged, but in a large number of cases reasonable precautions were not taken to protect the cargo.

Frequently the cargo handling costs on which crane advocates based their comparisons are costs of terminals operating with equipment which was obsolete many years ago. The crane advocates contend that the area of deposit of the ships gear is so small, the discharging is delayed; with the crane the area of deposit is larger and this difficulty is eliminated. However, with modern cargo handling equipment on the terminal this objection has no value.

The question has been raised as to the possibility of a cargo ship being able to place 5000 tons on a terminal in 18 ship hours because of lack of space. Here again, this is practical if modern stevedoring equipment is available. In some cases cargo is trucked economically 1000 to 1500 feet to warehouses by tractors and trailers. The cargo is stacked economically to the rafters by mechanical equipment —conveyors and electric crane trucks.

Some individuals with little or no experience with cargo handling operations have, like the crane advocates, based their conclusion on erroneous data. One of them has an idea of expensive cargo handling equipment on the ship. His plans are based upon the assumption that the average sling-load in the port of New York is 500 pounds. It is actually several times this amount.

As is frequently true if one agrees with a man's assumptions he will reach the same conclusions, but if his basic assumptions are erroneous, his conclusions are erroneous.

On Making a Cost Comparison

A comparison of cargo handling costs for an ordinary type cargo ship and a special type ship to be accurate must consider in the first case not alone stevedoring, checking, dock labor, supervision and insurance but also pier rental or wharfage or capital charges on the cost of the pier if owned. In the second case, stevedoring etc. is reduced, but at least part of the reduction is expended in another form —capital charges on the higher investment in the special type ship.

Cargo capacity of a ship is itself not the important factor in economical operations. The important factor is cargo capacity utilized. If a ship has space which cannot be utilized because the trade is overtonnaged or outward and inbound traffic is poorly balanced, the cost of providing this space is wasted. For example, a ship of 9600 deadweight tons in the intercoastal trade could only carry 600,000 feet of lumber on deck. Another, and smaller ship carried a greater amount of lumber because the available space, including deck space, was more effectively utilized. The larger ship had potential capacity to carry more tons westbound but with the exception of one or two voyages in a year there was not sufficient cargo to utilize this additional carrying capacity.

Baltimore Is Active

On the basis of incomplete October port figures for Baltimore, it appeared likely that the month will continue the relatively good showing of September. That period began with a 17 per cent foreign trade increase over August and nearly a 60 per cent export and import advance over September, 1932. Exports were higher than in any month since 1931, and imports were 81 per cent ahead of last year. Total shipping was 4 per cent above August and 10 per cent higher than September a year ago.

Dollar depreciation and increased industrial demand for raw materials have undoubtedly been motivating factors in stimulating exports and imports, respectively. It is also true that the figures looked better because of the sadly depressed period of 1932. But there is, nevertheless, a better tone to shipping and a better feeling in foreign trade, despite the many obstacles and unsolved problems still facing such business.

Port Houston Shows Gain

During the month of October a greater volume of tonnage was handled at the port of Houston, Tex., than in any previous month in its history, according to a report recently issued by J. Russell Wait, director of the port. In that month 1,590,744 tons of cargo valued at $45,081,883 were handled over various public and private terminals. This represents an increase of 42 per cent in tonnage over October, 1932.

This cargo was carried by a total of 496 seagoing vessels, 250 entrances and 246 departures, this also being the largest number of vessels to navigate the waterway in any one month.

A total of 282,384 square bales of cotton and 87,590 round bales were exported during the month which makes a total of 821,971 bales of cotton for the season beginning Aug. 1, 1933, and 2,191,794 bales for the first ten months of the calendar year. Houston is now far in the lead as the first cotton exporting port in the United States.

Other items of export were 2,799,868 pounds of cotton seed cake, 660,500 pounds of cottonseed meal, 799,946 pounds of flour, 17,411 tons of metals, chiefly scrap, enroute to Japan, 4,503,070 pounds of rice produced on the coastal plains of Texas, 11,655,472 pounds of carbon black from the gas fields of northeast and northwest Texas, and 3,654,562 pounds of general merchandise and miscellaneous freight.

Oil in its crude and refined state from the various refineries and oil terminals on the ship channel contributed toward the great amount of total tonnage.

The New York Shipbuilding Co., Camden, N. J., has already placed orders for approximately $8,000,000, for materials and equipment, since the company was awarded its naval building program Aug. 3, according to E. I. Cornbrooks, vice president and general manager. Mr. Cornbrooks also stated that additional orders would be placed as promptly as possible.

Pacific Tours Are Popular

Officials of the Matson Navigation Co., San Francisco, are optimistic on the outlook for the shipping business of its lines because of the favorable public reaction to the announcement of three separate Pacific cruises and excursion voyages announced for Matson-Oceanic liners in December and January.

Such a prompt expression of approval, from Americans throughout the nation, was received to the LURLINE'S South seas and Oriental cruise of 24,000 miles from January to April, that it became necessary to offer travelers additional cruises of shorter duration. As a result, the CITY OF LOS ANGELES has been scheduled for what is called an exploration cruise, from January 12 to February 21.

The Acheson Oildag Co., Port Huron, Mich., has available for distribution a technical bulletin dealing with the mechanics of lubrication with colloidal graphite. Copies will be sent on request.

Cleat Board Method Used to Speed Cargo Handling

THE fork truck cleat board method of handling cargo was used first for handling of 1500 to 2000 pounds of tin plate loaded on cleat boards raised a few inches above the floor to permit the forks of the truck going under the load.

The original application of this method was made in factories. It was later extended to steamship terminals and the stores department of railroads.

Recently the fork truck and cleat method was given considerable attention on the Pacific coast where other important developments in cargo handling methods have been put into effective service.

In discussing the economy and future possibilities of this method, it will aid if the application of the method to the Sacramento river lines skids and lift truck method of handling cargo is described. These lines have in service approximately 6000 skid platforms costing about $4.50 each.

A Typical Movement

Taking the movement of canned goods from the California Packing Corp. plant No. 11 at Sacramento, as an example of a movement, the skid platforms are loaded directly from the carton sealing machine. Six loaded platforms are loaded on a motor truck with a hand lift truck and hauled to the M street dock three miles away. At the dock the truck is unloaded with a gasoline lift truck and the platforms loaded onto the river vessel. When deliveries are made to steamship line's terminals at San Francisco, the skid platforms must be unloaded package by package. The problem is to extend the economy of the first part of the movement on to the San Francisco terminal and possibly even further without excessive equipment costs. If the cartons were loaded onto cleats instead of skids or if cleats were placed on the skids, a fork truck could place the loads on the terminal floor in units of 60 to 70 cases instead of handling case by case as the practice is now. The fork trucks could pile the canned goods two cleat loads high, thereby attaining conservation of dock space with a high degree of economy in handling costs.

When the outward steamer was ready to load, the fork truck would pick up the cleat loads and handle direct to ship side when hauls were short or place them on trailers for long hauls. The trailers would be made up into trains of two or more trailers and hauled by a tractor. At the ship the cleats could be handled into the ship by means of two steel stirrups. In the ship the packages could be unloaded and stowed. For long holds, a fork truck could be used in handling the loaded cleat boards to place of stowage.

It is possible that in some cases, the loaded cleat boards would be allowed to remain in the vessel so that a complete movement from cannery sealer to wholesale warehouse could be on cleat boards. The economy would be great—the only serious obstacle is the pig headedness of men who resist without reason constructive co-operation with others.

For another example, a large barge company operating across San Francisco bay is using the skid and lift truck method. This company is now planning on the adoption of cleat boards to eliminate the handling at San Francisco steamship terminals. For the present, because elevators have a capacity of only five tons, it will be necessary to use fork trucks at both ends, but in between it is necessary to use skid platforms and lift trucks for handling cleat board loads. Eventually, when the capacity of the elevators is increased, and other changes are made in the structure of the barges to accommodate the greater weight and height of the fork type machines, the cleat board method alone will be used.

Possibility of Increased Use

The cleat board costs about $2.50 each, a saving of $2 over the skid and the lost space is three inches instead of twelve.

The International Stevedoring Co., Portland, Oreg., are using 500 cleat boards 48 x 72 inches. These boards cost $1.60 each and have proved very satisfactory in service. The cleats are built of two 3 x 6-inch stringers on the sides and one 3 x 3-inch stringer under the center. The floor is constructed of two-inch planks.

Winter Mooring Rules

The Cleveland office of the United States Salvage Association Inc., under Guy A. Myers, principal surveyor for the Great Lakes district, has issued a complete set of rules and regulations for the winter mooring of vessels covered by marine insurance during lay-up.

Attention is called to the fact that special limitations and restrictions have been issued applicable to various ports where winter mooring is considered hazardous. Should conditions arise making it impracticable to adhere strictly to these requirements, the matter should be referred to G. A. Myers of the United States Salvage Association Inc. or to H. N. Herriman of the American Bureau of Shipping, whose decisions shall be final.

For those ports not mentioned in the regulations, mooring will be considered only after application is made to the Cleveland office of the United States Salvage association. Investigation will then be made and if conditions are found suitable approval will be granted provided that mooring be carried out under the supervision of a representative of the United States Salvage association.

Gain in Florida Travel

An early and successful tourist season from New York to Florida ports is indicated by the fact that the Clyde-Mallory lines, to meet demand for space, placed its big passenger liner SHAWNEE in the fast New York, Jacksonville, Miami, express service. An unusually large number of advanced bookings and inquiries for future sailing have been received, according to H. G. Wenzell, passenger traffic manager of the Clyde-Mallory line. An excellent travel season this winter is also anticipated for other services from New York to South Carolina, Jacksonville, Fla. and to Galveston.

A new bulletin has been issued by the Babcock & Wilcox Tube Co., Beaver Falls, Pa., on Diescherized pipe and tubing. This bulletin, the first published on this subject, contains the more important facts about the Diescher process and the scratch-free finish and uniform wall thickness of tubes made by that process.

Services Are Combined

The Hamburg American line and the North German Lloyd have formed an internal organization in Germany known as Nordatlantic-Gemeinschaft Hapag-Lloyd, under the management of H. Schuengel, for the purpose of conducting their joint services between Europe and the United States and Canada, excluding North Pacific.

On Nov. 1 announcement was made of the appointment of Christian J. Beck and John Schroeder as managing directors of these services. Mr. Beck will have charge of the freight and operating department, and Mr. Schroeder of the passenger and accounting department.

Useful Hints on Cargo Handling

A MAN on the West coast who is familiar with cargo handling operations recently wrote as follows:

"An esculator, as I see it, while suitable at some places, is not proper for terminal operation. You have to destroy one man's labor at one end of the chain ramp when piling freight on the conveyor for movement, and then build it up again at the other end. Remember that every time you handle a piece of cargo, it adds to its cost but does not increase its value; and in many operations we too frequently see the labor of one man destroyed by hand-piling or individual handling by another man. Occasionally this happens two or three times on a pier, all within a distance of 200 to 500 feet.

"I inspected a terminal at Portland, Oreg., some time ago. Here are two operations performed by one lift truck. One hundred and five slingboards of cargo, some of it piled two and three high, average weight 2½ tons, of case goods taken from pile and put on four-wheel trailers for movement to the ship. One hundred and five of these boards were loaded and moved to the ship in one hour.

"Another operation was 6250 cases, weighing 60 pounds per case, handled to the ship in two hours and twenty minutes."

Transporting Explosives

THE bureau of service of the interstate commerce commission on Oct. 31 issued revised proposed regulations for transportation of explosives and other dangerous articles by water.

Mr. Bartel, director of the bureau states:

"Two formal hearings on this subject have been conducted by the commission at its offices in Washington, numerous conferences have been held at the offices of the bureau of explosives in New York City, and of the commission in Washington, at which many changes, including the deletion of considerable matter, have been made, and it appears that substantial agreement has been reached among interested parties with respect to the proposed regulations. It is proposed that the matter of these regulations be disposed of as follows:

"Unless objections are filed within 20 days from the date hereof to any of the proposed requirements, the commission will consider the issuance of an order making the proposed regulations effective, and may temporarily suspend action on any of the requirements objected to pending further consideration."

THIS page is being devoted to short items on all matters having to do with the more efficient turnaround of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Portable Gantry Cranes

ONE of the chief contentions of those who advocate gantry cranes for terminals is that they are necessary for handling cargo to and from barges not fitted with cargo handling gear. The problem has been very effectively solved with a new method by the New Orleans Stevedoring Co. Inc., New Orleans, headed by Wm. J. Kearney. Motor trucks fitted with cranes, back up to the stringpiece and using platform and other type slings handle cargo rapidly and economically.

Tractors and trailers are used on the terminal. The platform slings are landed on a trailer in the same manner as if handled by cranes of the type used abroad. However, the motor truck crane is flexible; it can be moved from terminal to terminal, it can be used for piling on the terminal and in doing other useful work.

At times it is desirable to shift the barges to another terminal, the crane equipment can be moved without difficulty, while with the European and South American arrangement the barges must be confined to terminals fitted with cranes.

The platform slings used by the New Orleans Stevedoring Co. have proved very efficient, especially in handling packages, such as fibreboard boxes.

Height of 'Tween Deck

IN PLANNING the design of a ship for transporting cotton, tobacco, case oil, automobiles, newsprint, wood pulp etc. it was decided that the height of the 'tween deck underside the beams should be 10 feet 6 inches. This seemed to be a good height as it would accommodate the maximum number of tiers of bales of cotton, case oil, and other commodities which can be piled to the maximum height without damaging the lower tiers.

One important point to consider in determining the 'tween deck height is the depth of the coamings. In some ships the coamings are so deep that the controling height is much less than the maximum height underside the beams. This frequently makes it impossible to load large cases such as automobiles into the 'tween deck.

A great need is the modernization of freight and materials handling throughout the country. No one who is familiar with the facts can avoid reaching the conclusions that the methods are not the best.

Motor truck cranes discharging barges at New Orleans. Provide flexible operation as they can be moved to wherever they may be needed

Up and Down the Great Lakes

Freight Heavier—Ore Shipments Continue—Lake Levels—Season Coal Movement—Propeller Club Meets

TOTAL traffic through the United States and Canadian locks at Sault Ste. Marie canals during October amounted to 7,154,293, or almost twice the 1932 traffic. Ore, which amounted to 4,782,866 tons, as against 904,521 tons last year, was the chief factor in the improvement. Wheat shipments decreased by 22 per cent, and other grains were also slightly lighter. The total freight passing through the locks up to Oct. 31, 1933 was 37,117,026 tons as compared to 17,388,745 tons for the same period in 1932.

Shipments through the Welland ship canal showed a slight decrease for the month of October as compared with September, but at 1,352,644 tons it was 100,815 tons heavier than for the same period in 1932. Wheat was heavier than in 1932 by 30,348 tons, and rye increased by 15,368 tons, but all other grains were lighter. Shipments of pulpwood for the month of October were heavier by 25,908 tons, paper by 17,078 tons, merchandise by 41,737 tons, coke by 45,723 tons and iron ore by 42,289 tons. Total traffic through the Welland canal for the present season to Oct. 31 was 7,994,579 tons as compared to 7,304,173 tons for the same period in 1932.

Freight using the St. Lawrence canals during October amounted to 1,040,854 tons as against 1,013,729 tons last year. Rye and flaxseed were heavier than in 1932, but other grains were lighter, wheat decreasing by 62,621 tons, oats by 24,042 tons, corn by 15,341 tons and barley by 16,028 tons. There was, however, an increase in the movement of both hard and soft coal. Pulpwood shipments increased by 73,185 tons, paper by 14,525 tons, gasoline by 9378 tons and merchandise by 24,466 tons. For the season, up to Oct. 31, the totals were 6,170,652 tons as compared to 5,891,364 tons in 1932, an increase this year of 279,288 tons.

Propeller Club Meets

The Propeller club of the port of Cleveland held a meeting on Nov. 13 at Hotel Statler. The speaker at this meeting was Dr. Phillips Thomas, nationally known research engineer of the Westinghouse Electric & Mfg. Co., who gave a demonstration-lecture on "Electrons at Work and Play."

L. C. Hinslea, representing the Propeller club of the port of Cleveland at the annual convention, gave a report of the proceedings.

The next meeting of the Propeller club is to be held on Dec. 11.

October Lake Levels

The United States Lake survey reports the following monthly mean stages of the Great Lakes for the month of October, 1933, determined from daily readings of staff gages.

Lakes	Feet above mean sea level
Superior	602.85
Michigan-Huron	577.85
St. Clair	573.58
Erie	570.59
Ontario	243.85

Lake Superior was 0.01 foot higher than in September and it was 0.25 foot above the October stage of a year ago.

Lakes Michigan-Huron were 0.36 foot lower than in September and they were 0.23 foot below the October stage of a year ago.

Lake Erie was 0.47 foot lower than in September and it was 0.05 foot below the October stage of a year ago.

Lake Ontario was 0.52 foot lower than in September and it was 0.72 foot below the October stage of a year ago, 1.36 feet below the average stage of October of the last ten years.

Coal Movement Continues

Coal shipments from Lake Erie ports between the middle of October and Nov. 13 averaged 897,990 tons per week. The total cargo movement for the present season up to Nov. 13 amounted to 28,669,685 tons, as compared with 22,174,430 tons for the corresponding period in 1932. This was for cargo coal alone.

In addition to the cargo coal, vessels continued to move greater quantities of bunker coal. The total for this season up to Nov. 13 was 915,327 tons, compared with 554,015 tons for the corresponding period in 1932.

The total coal movement, cargo and bunker, for the season 1933 to Nov. 13 was 29,585,012 tons as compared with 22,728,445 tons for the corresponding period of 1932, and 30,042,106 tons for the same period in the season 1931.

It is evident from these figures that the movement during the season 1933 is nearly up to the movement during the year 1931. It is, however, 7,083,468 tons less than for the same period in the season of 1930.

Though the season is now nearly ended, it is believed that existing commitments will bring the total for the year, as it has been for each month, well above the movement in 1932, and close to if not exceeding 1931.

Ore Shipments Heavy

During October shipments of ore from upper lake ports amounted to 4,542,510 tons as compared with 926,561 tons for the month of October, 1932. Up to Nov. 1, 1933, a total of 20,842,083 tons of ore were shipped from upper lake ports as compared with 3,317,716 tons up to Nov. 1, a year ago. Balance of ore on docks at Lake Erie ports on Nov. 1, 1933 amounted to 5,301,505 tons as compared with 5,223,086 tons Nov. 1, 1932.

The increase in the ore movement this year compared with last year still continues. The increased movement in October this year as compared with October last year, amounted to 3,615,949 tons. Up to Nov. 1 this year 17,524,367 tons more of ore had been moved than in the same period last year.

The predicted total movement of 20,000,000 tons for the season was exceeded on Nov. 1 when a total of 20,842,083 tons was reached. As the season is drawing near its close, vessels are being taken off the ore carrying trade. There are, however, still some definite commitments to make this total somewhat higher.

The season of navigation for the port of Churchill, Hudson Bay has closed for 1933. Shipments of wheat to be moved in 1934 are coming into the port. It is expected that 2,400,000 bushels will be held in winter storage.

It is predicted that next season will see an increase in the number of incoming cargoes.

Lightship Crew Commended By the President

President Roosevelt sent a letter to Secretary Roper commending the officers of the crew of Diamond Shoal lightship for bravery and the display of a high order of seamanship in bringing their vessel safely through the hurricane of Sept. 15 and 16. The president said in part:

"I'm fully appreciative of the exceptional character of the services performed by these men in saving this vessel, and in the protection of shipping along the coast; and I wish you would convey to them my personal commendation for the manner in which they performed their dangerous duties during this storm."

Diamond Shoal lightship, stationed off Cape Hatteras, North Carolina, was caught in the center of a tropical hurricane, but the crew, living up to the traditions of the lighthouse service, made every effort humanly possible to maintain the ship on its station.

When the lightship was finally forced off station, despite its 6000-pound anchor and 12 tons of anchor chain, and drifted on to the dangerous Diamond shoals, the crew through skillful seamanship, managed to get the ship off the breakers and away to sea. During the storm the captain was injured when a port in the pilot house was battered in, and the mate had several ribs broken while trying to lash a ventilator which had nearly carried away.

Herbert K. Oakes Dies

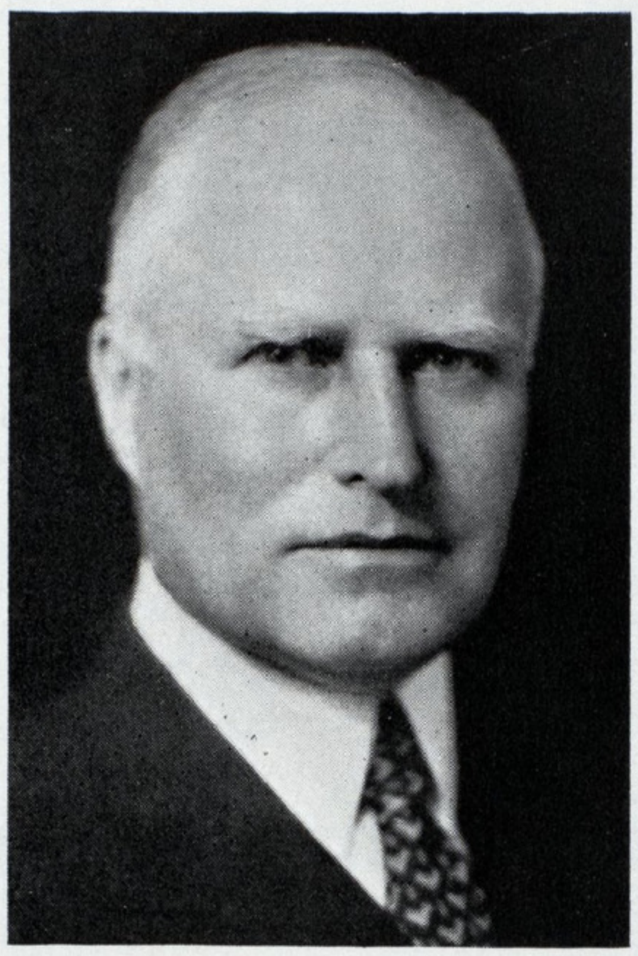
Herbert K. Oakes, a well-known figure in lake shipping, vice president of the Franklin Steamship Co. and formerly vice president of the Bethlehem Transportation Co., died at his home in Cleveland, Nov. 16 at the age of 60. Mr. Oakes had been ill for over a year, but his sudden death, from a heart attack, was unexpected.

For more than 35 years he was actively connected with Great Lakes shipping first as admiralty lawyer, and then as manager and owner of vessels. He was born at Milford, Me., in 1873. His father, Benjamin Oakes, became interested in lumber operations at East Tawas, Mich., where the son attended the public schools, later entering the University of Michigan Law school, from which he was graduated in 1896.

After entering business he became a partner in the firm of Shaw, Warren, Cady & Oakes, practicing admiralty law in Detroit. He continued active in this work until 1911 when he moved to Cleveland and assumed charge of the operation of the Franklin Steamship Co.

Until his health began to fail, he was also vice president in charge of operation of the Bethlehem Transportation Co., Cambria Steamship Co., and the Mahoning Steamship Co. He took an active part in the affairs of the Lake Carriers association, serving as a director. He was also a director of the Great Lakes Protective association, the Cleveland chamber of commerce and the Great Lakes Engineering Works, Detroit. After coming to Cleveland his business interests widened rapidly and he became recognized for his thorough knowledge of lake transportation affairs.

Among his clubs were the Union,



Kirtland country, Mayfield country and Bay City Yacht club of Bay City, Mich. He found recreation in travel and golf. In 1903 he married Miss Harriet Waller. He is survived by his widow and three children, Nathan W. Oakes, Herbert K. Oakes Jr., and Mrs. D. T. Moore Jr., of New York.

Funeral services were held at his home in Cleveland on Nov. 18. In accordance with his wishes, burial was at East Tawas, Mich. Among the honorary pall bearers were Harris Creech, John Webster, Walter C. Merrick, George Pope, J. Arthur House, Dr. H. H. Drysdale, George M. Humphrey, and E. R. Grasselli, Cleveland; Henry K. McHarg Jr., Washington; E. L. Ford, Detroit; F. G. Hardwell, Chicago; W. F. Jennison, Bay City, Mich.; L. R. Davidson, Buffalo; Ira A. Campbell, New York; Fielding H. Yost, Ann Arbor, Mich.; and John M. Gross, Bethlehem, Pa.

New French Line Manager For United States

Henri Morin de Linclays, recently appointed general manager of the French Line for the United States and Canada, arrived in New York Oct. 31, on the French liner ILE DE FRANCE, to take over his new duties. He was born in Nantes, France, June 22, 1887.

His first shipping experience was acquired in England in 1907 and 1908. He joined the staff of the French line in 1911, and in 1913 was sent to Berlin to establish the company's office there. After the war he was sent to Morocco where he organized the Casablanca branch. In 1922 he became manager of the Algiers branch and was largely responsible for buiding up the extensive organization of the French Line in North Africa.

When the French line was reorganized in the fall of 1931, he returned to Paris as general secretary of the company. He relinquished this position to accept his new appointment in the United States. Mr. Morin de Linclays has been one of the closest collaborators of Henri Cangardel who became managing director of the line at the time of the re-organization.

His contact with Americans goes back to the World war, when, as an officer of artillery in the French army, he was attached to the American expeditionary forces as an instructor of anti aircraft artillery. He is a graduate of the colleges of Vannes and Nantes., and is a keen student of history. He is an enthusiastic sportsman and is particularly interested in riding, hunting, tennis and swimming.

Positions Are Open

The United States civil service commission has announced open competitive examination for positions as inspector of shipbuilding and naval material. Applications for positions as senior inspector, inspector and junior inspector may be filed with the United States civil service commission at Washington, D. C. The positions cover work in connection with hull ship construction, mechanical branches of ship construction, and the electrical branch of ship construction.

As the result of these examinations, appointments are to be made for inspection duty at shipbuilding plants where naval construction is in progress under contract at private shipyards, or at manufacturing plants where engineering materials are in process of manufacture under naval contracts.

Naval Architects Meet

(*Continued from Page* 17)

were all duly elected to the membership of the society on Nov. 17. In the fiscal year 1932-1933, 21 deaths were reported, one permanent member, seventeen members, and three associates. During the same period 54 resignations were received; 42 members, 11 associates and one junior. At the close of the 1932 meeting the total membership was 1658. Subtracting deaths, resignations and suspensions, and adding two reinstatements, the membership, Oct. 31, 1933, was 1526. Adding to this number the 69 members, associates and juniors, elected at the 1933 meeting, the total membership at the end of this meeting was 1595.

As previously mentioned, Rear Admiral George H. Rock, CC., U.S.N. (retired), head of Webb Institute of Naval Architecture, was elected president for the three-year term ending Dec. 31, 1936. He takes office Jan. 1, 1934, succeeding J. Howland Gardner. Mr. Gardner in his three year term of office has vigorously maintained the growth and development of the society, and has filled the office with the same high distinction set by his predecessors since the founding of the society over forty years ago. Admiral Rock, the new president, is a distinguished officer of the United States navy and formerly held the office of chief constructor and chief of the bureau of construction and repair of the United States navy.

Other officers and council members elected at this meeting are as follows:

Honorary vice presidents; Charles F. Bailey and Hugo P. Frear.

Vice president, for the term ending Dec. 31, 1936; S. Wiley Wakeman, Capt. William McEntee, CC., U.S.N., Theodore E. Ferris, and Robert Haig.

Council members, for the term ending Dec. 31, 1936, are, representing members, Robert Haig, William S. Newell, Capt. Roger Williams, James Swan, J. Lewis Luckenbach, and Commander Harold E. Saunders, CC., U.S.N.; representing associates Ira A. Campbell, Edward P. Farley, and John D. Reilly. Council member representing members, term ending Dec. 31, 1936, Robert L. Hague, *vice* Robert Haig; council member representing members, term ending Dec. 31, 1934, Capt. Henry Williams, CC., U.S.N., *vice* Theodore E. Ferris.

The executive committee consists of Washington L. Capps, Homer L. Ferguson, J. Howland Gardner, Joseph W. Powell, Morris Douw Ferris, W. W. Smith, and Robert Haig. H. Gerrish Smith was re-elected secretary-treasurer and Thomas J. Kain, was re-elected assistant secretary treasurer.

The financial condition of the society continues excellent. The interest received from the endowment fund investments and saving bank deposits for the year ending Oct. 1, 1933 amounted $5980.79.

At the banquet on the evening of Nov. 17 Rear Admiral E. S. Land, CC., U.S.N., chief constructor of the navy, made an earnest plea for the support of the members of the society in the project now under consideration by the public works administrator for the building of a modern model basin at Cabin John, Md. After most careful consideration complete plans and specifications have been prepared for this project. It is something vitally needed for the good of the industry as a whole both for naval and merchant vessels and it is to be hoped that favorable action will be taken in the near future.

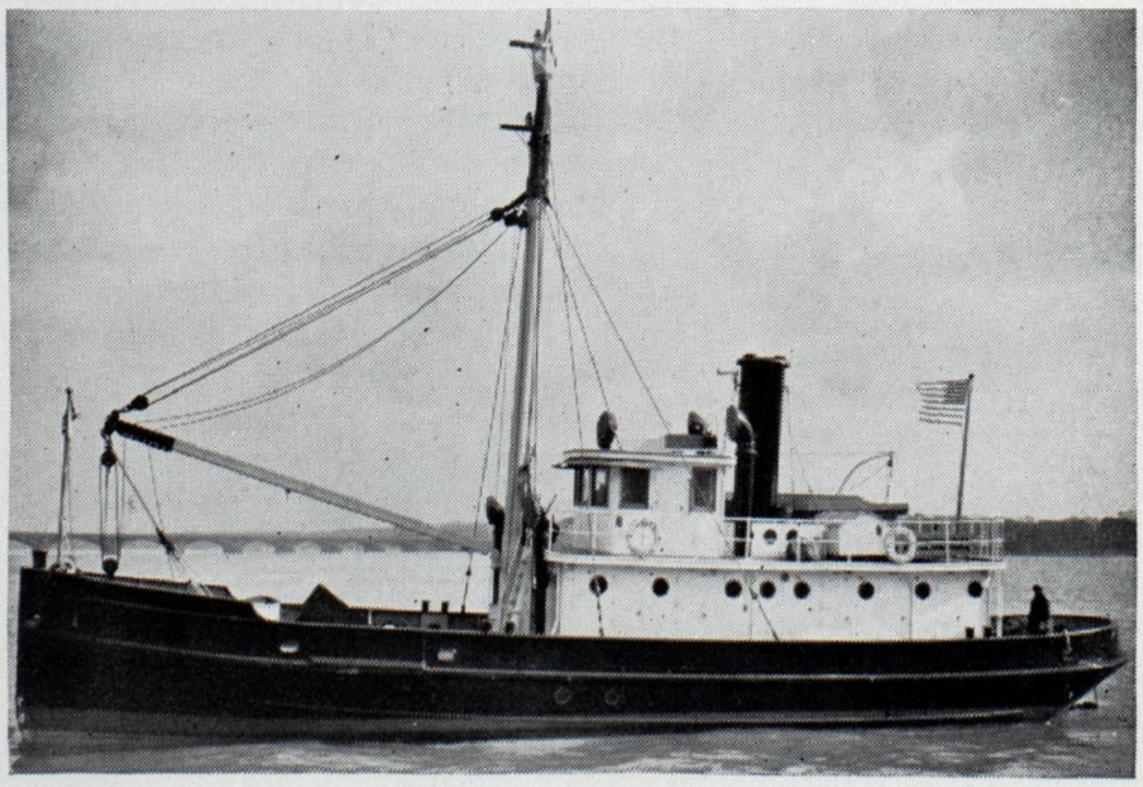
Contrary to usual custom at the banquet, speeches, except the address by President Gardner and the talk by Admiral Land referred to above, gave way to entertainment features, arranged under the personal supervision of Robert L. Hague, president of the Standard Shipping Co., who was the chairman of the banquet committee. Mary Lewis Hague, former member of the Metropolitan Opera Co., sang the National Anthem. The reception prior to the banquet proved to be even more popular, if that is possible, than in previous years.

Arrangements were made for a dinner dance on board the new transatlantic liner, S. S. WASHINGTON of the United States lines, at Pier 61, North river, on the evening of Saturday, Nov. 18. All of the reservations were completely exhausted and from the social point of view this event proved to be one of the most successful held by the society.

Dahlia, New Lighthouse Tender Completed

A NEW lighthouse tender, the DAHLIA, was completed on Nov. 10 for the bureau of lighthouses by the Great Lakes Engineering Works, River Rouge, Mich. This vessel was launched on Aug. 26. An article on the launching appeared in the October MARINE REVIEW.

The DAHLIA, of substantial steel construction, was designed primarily for taking care of lighthouse work in the Detroit and St. Clair rivers, which accounts for the comparatively small dimensions. The hull particulars are as follows: length overall, 81 feet, 2 inches; length between perpendiculars, 72 feet; breadth molded, 20 feet; depth molded, 9 feet, 6 inches; draft, forward, 6 feet; aft,7 feet; displacement loaded, 160 long tons. The gross tonnage is 111 and the net tonnage, 52. The cargo capacity is 5 tons, and the bunker fuel capacity is 5 tons. The speed is 8 knots.



Single screw diesel drive lighthouse tender Dahlia, built by the Great Lakes Engineering Works, for service on the Detroit and St. Clair rivers

Propelling power is supplied by one Winton diesel engine, of 4 cycle type, six cylinders, 10 inches in diameter and 14 inches stroke. The horsepower is 235 at 350 revolutions per minute. There is one boiler for heating only. This boiler was supplied by the Almy Watertube Boiler Co. and has 77 square feet of heating surface. It is oil fired.

One auxiliary Winton diesel engine generator is fitted. The engine of 15 horsepower has two cylinders, 5 inches in diameter and 7 inches stroke. The generator is of 10 kilowatts capacity.

Included in the auxiliary equipment are; pumps by Nash Engineering Co., Westco Chippewa Pump Co., Gould Pumps Inc., and Rumsey & Co. The windlass and the hand steering gear were supplied by the Lidgerwood Mfg. Co. The same company also supplied the winch which serves a five-ton derrick with 27 foot steel boom serving one hatch 5 feet by 5 feet, 6 inches. The refrigerator was supplied by the General Electric Co. Ray Engineering Inc. supplied the oil burners for the heating boiler.

Personal Sketches of Marine Men

Andrew Hudson, Sales Manager, Trussweld Division, United Dry Docks Inc.

By Ben K. Price

BORN in Kansas, his first contact with the sea was on the sailing vessel ARGONSSA out of Beaumont, Tex., for South America.

AFTER years of fighting and prospecting in Mexico, he engaged in shipping and operated a large fleet of tugs and barges.

HIS experiences on land and sea qualify him for the job of introducing a revolutionary type of vessel construction.

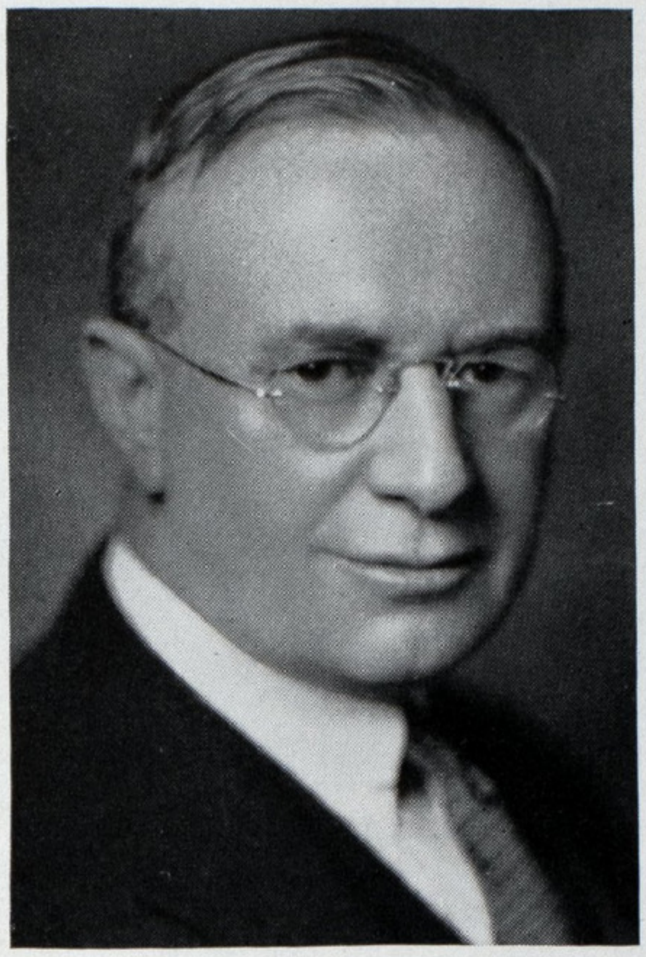


Photo by Blank & Stoller

A MAN who sold a revolutionary idea to a conservative industry, and made it stick—such is Andrew Hudson, general sales manager of the Trussweld division of United Dry Docks Inc., 11 Broadway New York City. Meeting up several years ago with J. Kjekstad, inventor of the trussweld and reverse channel types of barge construction, he has been able to promote the use of these rigid types in the face of tradition and of depressed business activity generally. In fact, throughout the recent years of profound dullness in shipbuilding he has been able to keep a hull on the ways at all times.

"Andy" Hudson was qualified for this task by temperament, experience and vision. Sailing the seas as a lad of fourteen, affiliated with marine shipping off and on ever since, a man who has roamed the world as a soldier and adventurer, yet maintaining a broad rational outlook, a man of good heritage, he gained an appreciation of values.

Born in 1876 at Fredonia, Kan., the son of a United States district attorney, whose duties carried him to many sections of the country, young Hudson spent several years of his early childhood in Ogden, Utah. He then went with his family to New Orleans, and later to Beaumont, Tex. when he first went to sea, shipping as a mess boy on the sailing vessel, ARGONSSA, in South American trade.

Two years later he resumed his academic education, and was in a military school in Texas, when the Spanish-American war broke out. Whereupon with a commission as a second lieutenant, he went to the Philippines, returning three years later as a brevet major, injured and somewhat broken in health and requiring two years for recuperation.

Brick and window glass manufacture in the Middle-west—the enterprises of his older brother—engaged his attention, also natural gas, then oil drilling in Texas, but in a few years he was again off to the wars. This time it was in South and Central America, where he became mixed up in a round of revolutions—revolutions in Venezuela, Colombia, Honduras and Nicaragua. A born soldier and adventurer, he gravitated to scenes of action, like a fly to molasses. Then three years of relative calm, in Mexico, drilling for oil and mining for gold and silver, and again in the throes of a revolution, this time fighting for the lost cause of Francisco Madero; and in this he lost a fortune, one of several made and lost in the course of years.

Turning to the sea, his first love, he operated a fleet of tugs and barges out of Galveston, Tex., in handling oil and clamshell. Within a few years he owned as many as 16 tugs and 65 barges, to say nothing of operating a number of chartered vessels. In this and affiliated enterprises he not only operated under his own name, but headed the General Development Co. and the Independent Oil Transport Co. For a couple of years Mr. Hudson furnished a large part of the fuel oil that went to Cuba.

Reorganization of certain of the larger oil companies partially as a result of trust investigations affected his status as shipper. So in 1914 he sold out and again returned to Mexico, towing oil along the Panuco river and prospecting for gold and silver with only moderate success. Two or three years, and he returned to the United States and engaged in ocean towing, specializing, in fact, in coal towing from Norfolk to Boston. At that time one of his tugs, the 1200-horsepower TARTER, was the most powerful in the world. Then a few years later came the diesel freighters and ocean going colliers, and so rapid were the inroads of these vessels, that his business, a prosperous, flourishing business, dwindled to almost nothing within a period of six months.

Back again to Mexico he went, and again drilling wells and again going broke, and again back to this country, to New York, where after three years as a ship and oil broker, he became affiliated with Mr. Kjekstad. They conducted their work at the Sullivan yard in Elizabethport, N. J., and three years later licensed the United Dry Dock Inc., and formed the Trussweld division.

His maritime affiliations include the Marine Square and Propeller clubs of New York.

Reviews of Late Books

Steam Propulsion Developments, by C. R. Ferris, B. Sc., holder of extra chief engineer's certificate from the board of trade: 111 pages; 9½ x 6½ inches; more than 50 illustrations, photographs and line drawings; published by the *Journal of Commerce and Shipping Telegraph*, Liverpool, England; supplied by MARINE REVIEW and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

Anyone interested in steam engineering as applied to ships will find this book of exceptional value. It contains much information from the practical standpoint on what is being done both in regard to the form of the vessel and in engineering to provide the truly ecenomical ship.

The developments in marine steam engineering have been especially notable in recent years. These developments are covered by Mr. Ferris in his new book in a clear and logical manner, for the benefit of sea-going engineers, and marine superintendents and port engineers ashore, who desire to be informed on the progress that has been made.

In this book are described and illustrated the various types of propelling machinery and equipment not only for new ships but for existing ships that have been modernized. A list of these "rejuvenated" ships is given with the fuel consumption in many cases so that comparisons may be made. In fuel consumption figures, attention is called to the average results rather than those attained on the trial trip.

Ship operators, as well as engineers, will find this book of real practical value because of the analysis of the solutions offered for the fuel economy problem. It is shown for instance that in some cases the plant giving the lowest specific fuel consumption may not necessarily be the most profitable to the owner. In this connection the author considers the effect of high first cost of new and reconditioned vessels in wiping out the profits which would accrue from an otherwise highly efficient job. He points out that it is necessary to consider each case on its merits and account must be taken of the service of the ship, the space available in the engine room, the time required for alteration to existing ships and other factors which are likely to affect the final operating results.

Each of six sections in the book deals with some branch of steam development. The first section covers seven different methods of effecting fuel economy by utilization of the exhaust steam. The second section deals with modern arrangements of steam cylinders, valve ports, and valves. The third section is devoted to boilers and the latest types of steam generators, air preheaters, superheaters and methods for heat recovery.

The fourth section takes up electrical propulsion and both direct and alternating current systems are described. The fifth chapter discusses naval architecture insofar as it relates to the economic shipform. The sixth section is devoted to a discussion of appendages, such as propellers and special type of rudders.

The Log of the Betsy Ann, by Frederick Way Jr.; cloth, 293 pages, 8 x 5½ inches; 24 illustrations; published by Robert M. McBride & Co., New York; supplied by MARINE REVIEW for $2.75, plus 15 cents postage, and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

As a record of actual experience in trying to revive the packet boat business on the Ohio river this book is a unique contribution to the lore of river navigation. In a vivid way it brings out the possibilities and the difficulties attending such traffic.

In 1925 the author, then 24 years old, already having had some experience as a clerk on river boats, became the owner of the 26-year-old river boat BETSY ANN and immediately began operating her in service between Pittsburgh, intermediate points on the Ohio river, and Cincinnati, in a regular freight and passenger service. The trials and tribulations as well as occasional successes of this service over a period of five years are described in an interesting and natural manner giving a colorful picture of river operations of our own time.

As a business proposition, his venture did not prove successful, though there were times when the outlook was favorable, but it may well be that what he did succeed in doing with the old BETSY ANN and the GENERAL WOOD has had a direct effect in stimulating further effort for a more complete utilization of these great inland waterways. The famous race between the BETSY ANN and the CHRIS GREENE which was widely reported all over the country is one of the striking episodes described in this book.

From the technical point of view there is much in the experience of the author, not told in sufficient detail in this book, which would be of value in any appraisal of the present and future usefulness of the Ohio and Mississippi valley waterways which are now ready to serve commerce in a modern way.

Hints on the Register Tonnage of Merchant Ships, by E. W. Blocksidge, member, Institution of Naval Architects and ship surveyor to Lloyd's Register of Shipping; 106 pages; 8½ x 5½ inches; a number of illustrations and tables; published by the *Journal of Commerce and Shipping Telegraph*, Liverpool, England; supplied by MARINE REVIEW and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

This book has a splendid purpose—to be helpful in a better understanding of the difficult subject of tonnage measurement of ships; and it comes nearer accomplishing its purpose than any other book we have seen. It is a most useful publication for shipowners, shipbuilders, marine superintendents, dock authorities, underwriters, ship's officers and all others concerned in any way with the tonnage of ships.

Tonnage regulations as actually in force are described in a clear manner, free from confusing technicalities giving the reader an intelligent insight into those essentials which have a direct bearing on the successful operation of ships in their relation to the measurement for register tonnage.

Separate chapters deal with the differences which exist between British regulations and those of other countries, and the rules governing the issue of Panama canal and Suez canal special tonnage certificates. In the last chapter reference is made to the proposals of the Special Advisory Technical committee set up by the League of Nations to deal with the subject of tonnage for international agreement.

In the introduction the author brings out the fundamental objectives of his new book. He says in part: "Tonnage has a direct bearing on the design of all types of ships; and is of special significance, therefore, to shipbuilders, and naval architects. It influences the financial operations of shipowners who pay dues in accordance with the amount assessed on the ships of their fleet. It provides the basis upon which the dock authorities and harbor boards make their charges to the shipowners; and is the standard on which the dues are at present applied by the government. It is national in its administration and international in its influence.

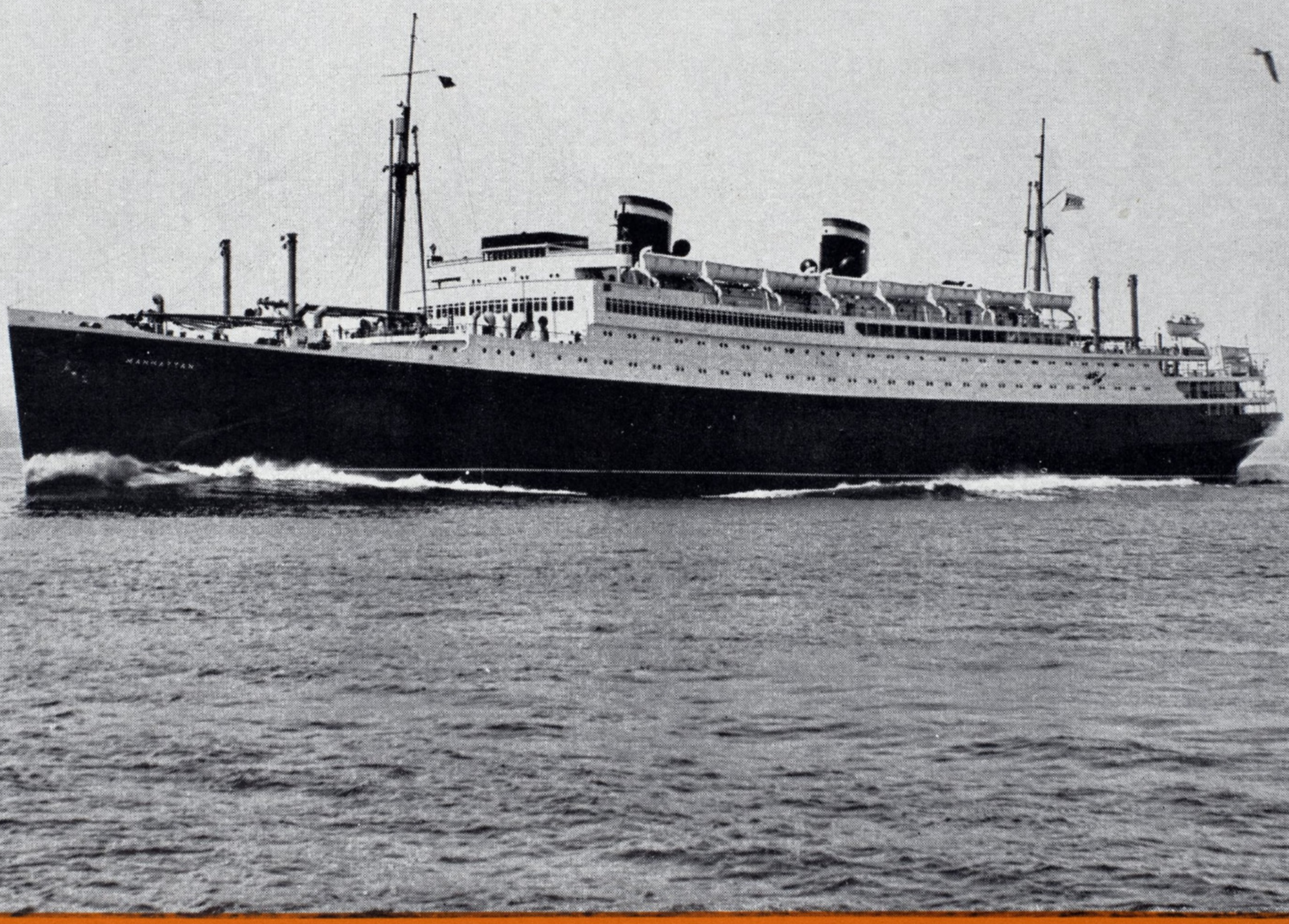
"Tonnage regulations have made progress through the experience of many years; but their application to the measurement of modern merchant ships has become very difficult of interpretation and perplexing to everyone associated with the operation of ships."

We are glad to recommend this treatise on tonnage as thoroughly authoritative and as a contribution of real value to the literature of the marine industry.

Marine Review

Reg. U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water



T. S. S. Manhattan

December, 1933

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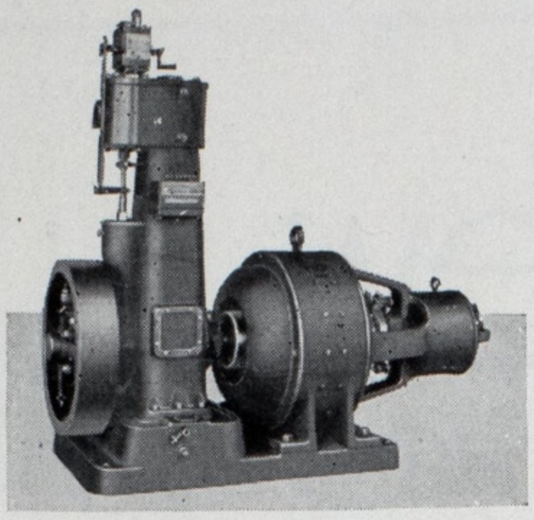
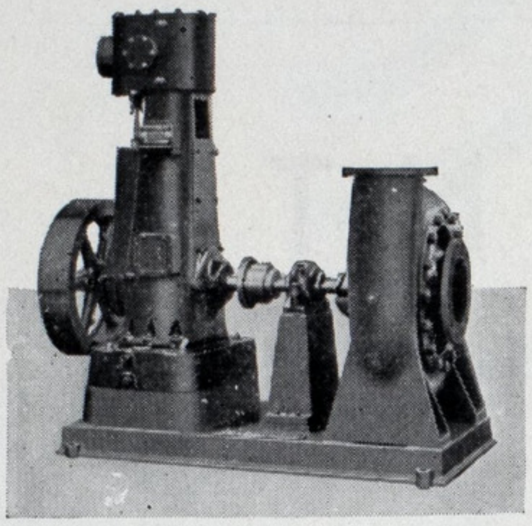
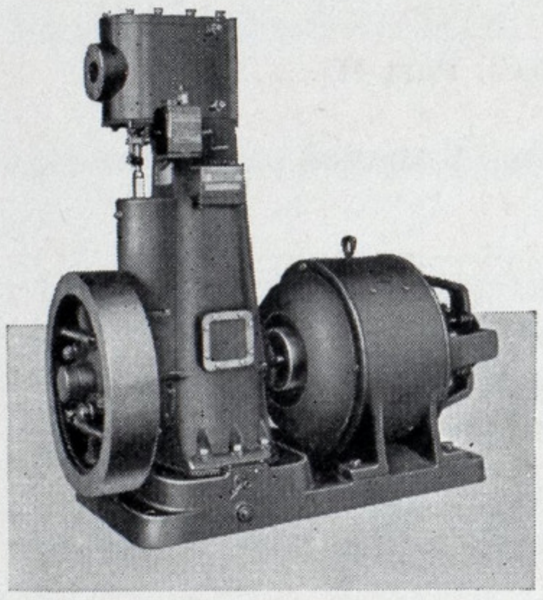
An Actual Record of Economy and Efficiency



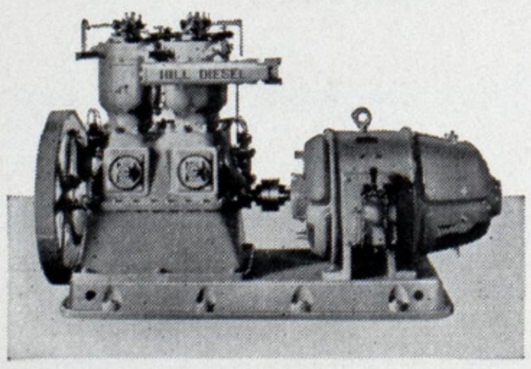
Direct connected A.C. Generating Sets with Vertical or Horizontal Enclosed Self-Oiling Engines. 6.3 to 187 Kv-a.



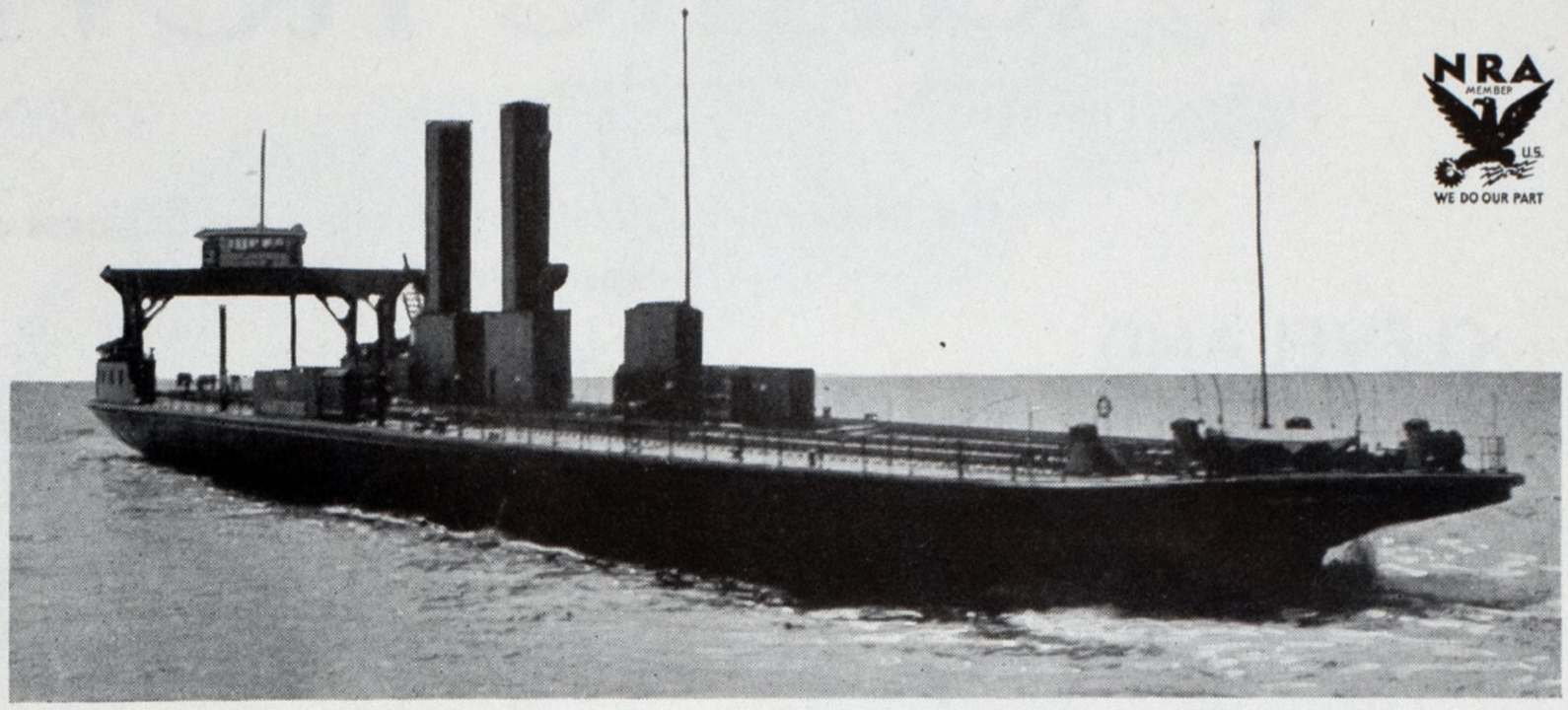
Enclosed Self-Oiling Engines for driving Pumps, Compressors, Fans and Stokers. Vertical or Horizontal. 1 to 450 h.p.



Direct connected Marine D.C. Generating Sets with Vertical or Horizontal Enclosed Self-Oiling Engines. 1 to 150 Kw.



Generators for Gasoline or Diesel Engine Drive. D.C.—⅓ to 60 Kw. A.C.—1 to 63 Kv-a.



Seven Years of Service at $6.38 per Year for Repair Parts on TROY-ENGBERG Generating Sets!

THE MANITOWOC shown above is a car ferry, built in 1926 by the Manitowoc Shipbuilding Corporation for the Wabash Railroad. Its equipment includes three Troy-Engberg Generating Sets—one 5Kw and two 12½ Kw.

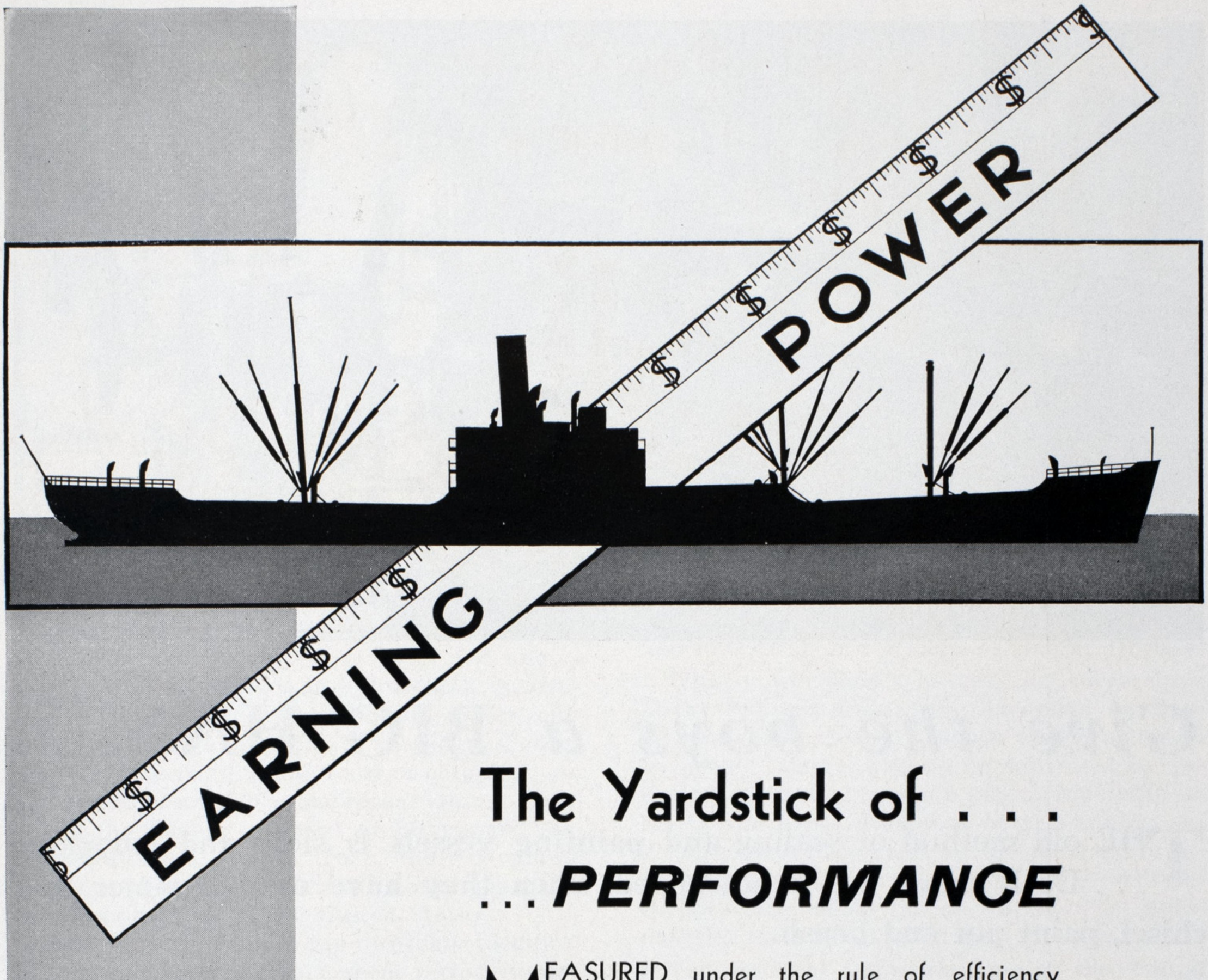
During the seven years that the MANITOWOC has been in active service (and car ferries run the year around), we have furnished repair parts that average $6.38 per year, per unit. This is only ½ of 1% per year, on the original cost—over a seven-year period, and includes expendable materials such as generator brushes. The satisfaction and the money value of uninterrupted service as indicated by this record, cannot be figured in dollars and cents, but it is an important consideration for every operator of either a fleet or a single vessel.

Troy-Engberg Engines, Generators and Generating Sets for operating compressors, pumps and other auxiliary equipment, and for lighting systems, *save money*. They give long, faithful service with minimum attention and expense, because they have generous design and trouble-proof construction. They have no oil leakage—operate without cylinder lubrication—require no long warming up—have low, maintained steam rate—and superior speed controls to maintain constant generator voltage and proper speed range. They are backed by 45 years' experience in building marine equipment.

For detailed specifications, prices and performance records, address Troy Engine & Machine Co., 2256 Railroad Avenue, Troy, Pennsylvania.

TROY-ENGBERG

M-33-4



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. . . *PERFORMANCE*

MEASURED under the rule of efficiency — Earning Power — performance figures reflect the outstanding design and skillful workmanship of vessels built at NEWPORT NEWS.

Two unusual cargo ships are now under construction at NEWPORT NEWS. The arrangement of holds, cargo handling facilities and the economy of operation will make a distinct appeal to every American shipowner operating vessels of a similar type which will soon require replacement.

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Newport News, Va. 90 Broad St., New York City

Give the boys a BIG HAND!

THE old method of scaling and painting vessels is slow and laborious . . . Deck hands are handicapped when they have only hammer and chisel, paint pot and brush.

The modern method is quicker, better, more economical. When the deck hand has Pneumatic tools at his disposal, supplied by air from a Westinghouse Air Compressor, he has enlarged facilities for doing the necessary work of keeping the ship shipshape.

WESTINGHOUSE TRACTION BRAKE CO.

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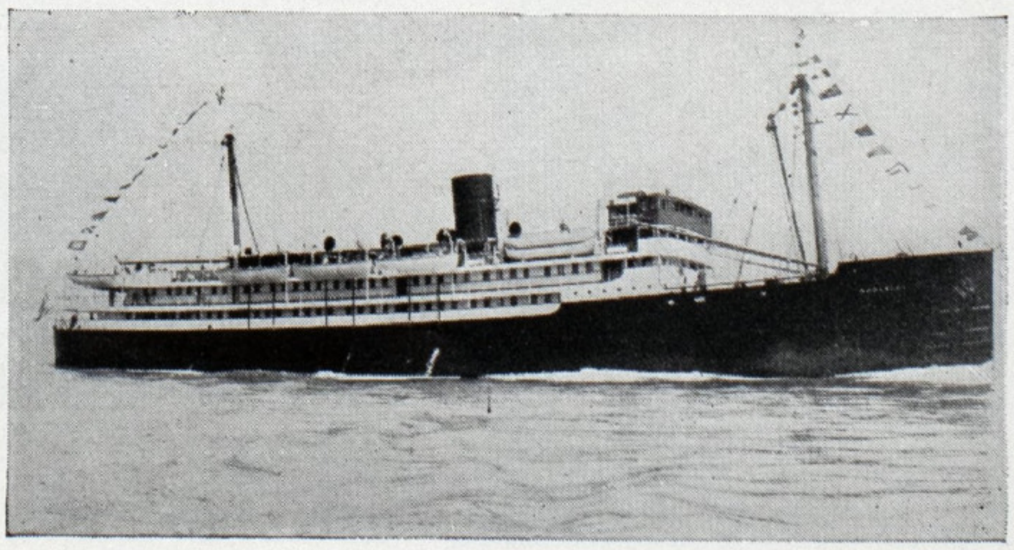
The Westinghouse Steam Driven Air Compressor is compact, rugged, easily installed. Ideal for use on board ship, in the harbor, or in the ship yard. Made in four sizes, 35, 49, 66 and 150 cu. ft. displacement. We also make a complete line of motor driven compressors.



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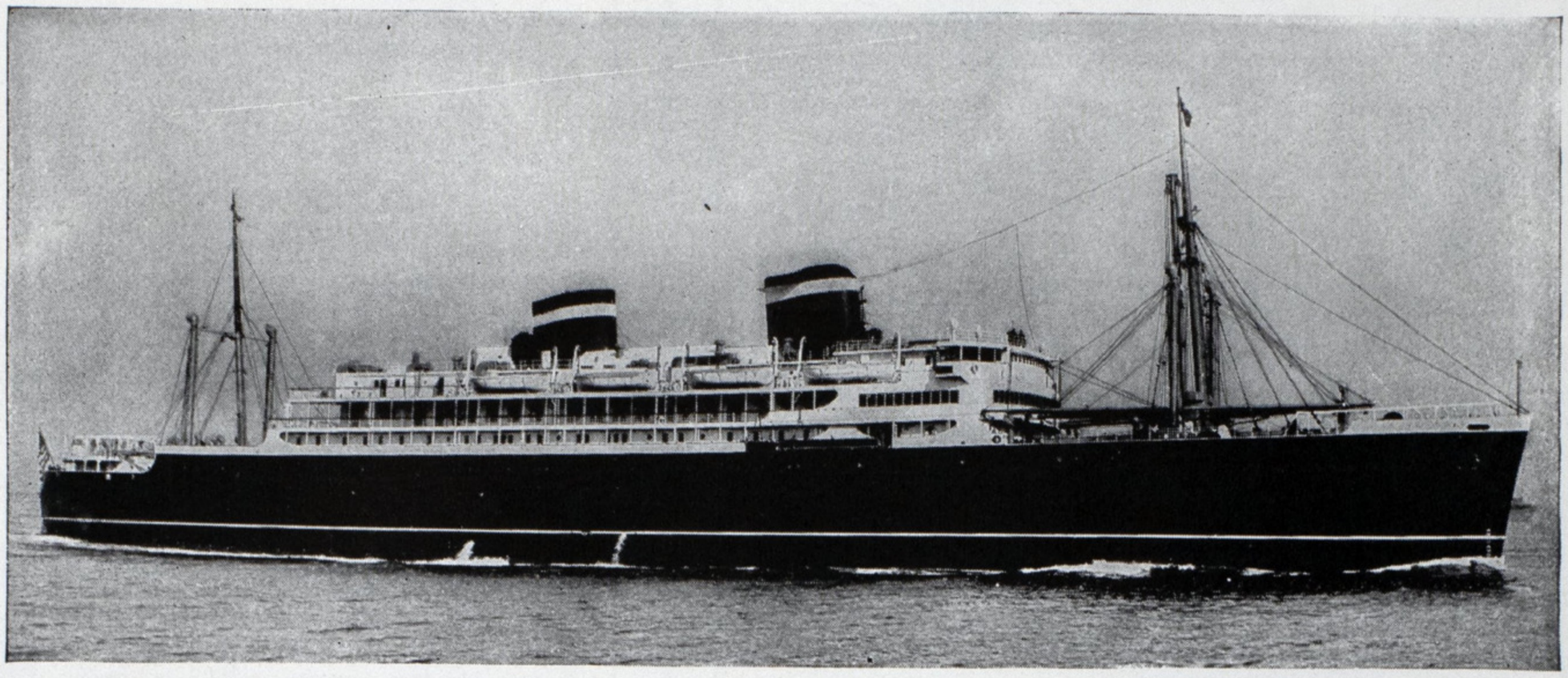
S.S. SANTA ROSA, one of four sister ships...built for the Grace Line by the Federal Shipbuilding and Drydock Co. during the years of 1932 and 1933.



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If you have a passenger ship, freighter, tanker, tug or any other floating property or marine equipment for sale advertise it in Marine Review.

The rate is $3.00 for a minimum advertisement of 30 words. Additional words, 10c each.

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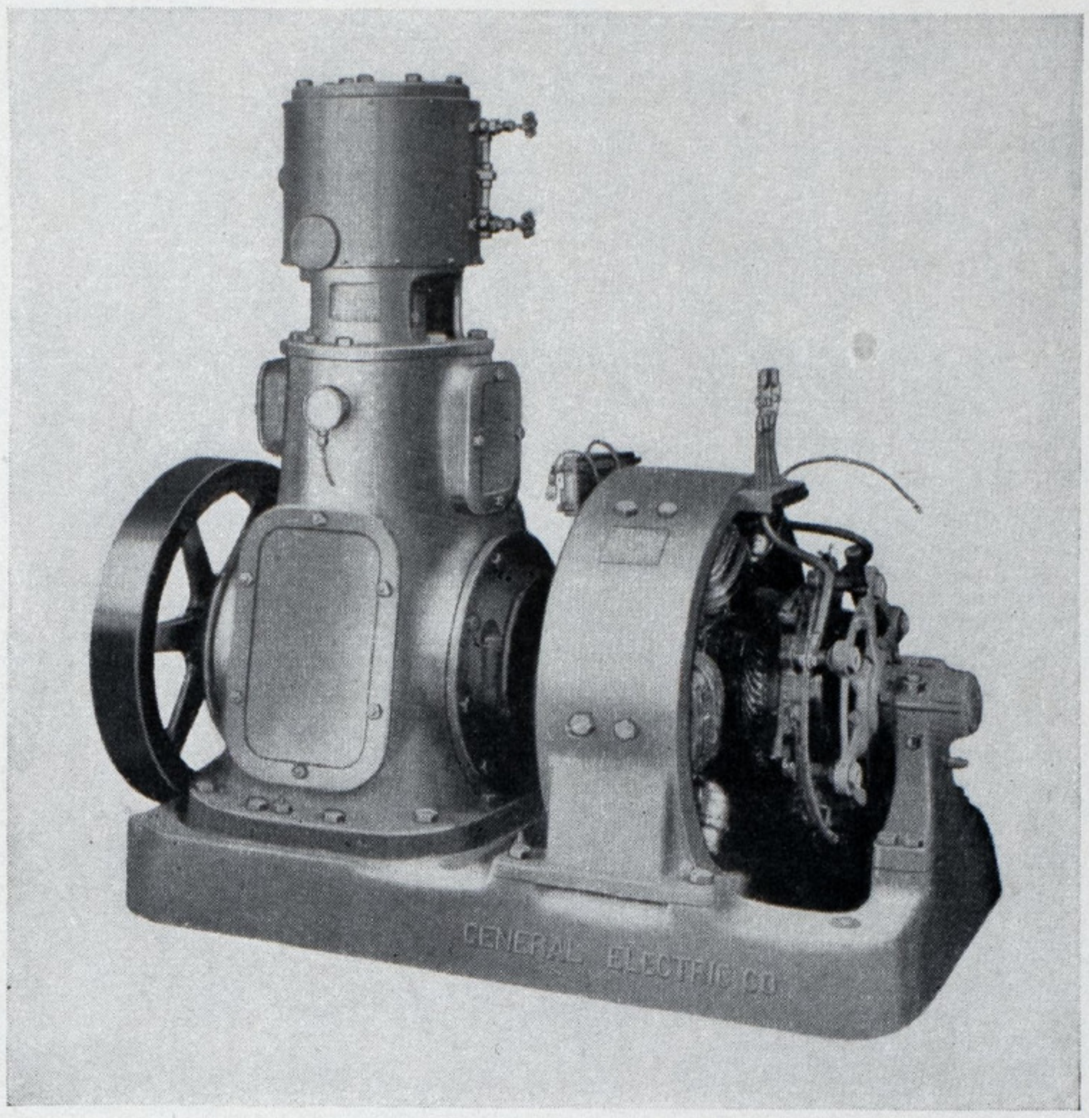
ELECTRIC EQUIPMENT ENGINEERED FOR MARINE SERVICE



This Trim Generating Set will meet many of your needs

If you require small blocks of power—for lighting, for auxiliaries, for radio — this G-E marine set will supply them reliably and efficiently.

It consists of a highly efficient steam engine, which takes steam at any standard pressure and temperature and drives a G-E generator that delivers direct-current power at 110 to 125 volts.

The ratings are from 5 to 60 kw.—for either two-wire or three-wire service. Sizes up to 30 kw. are carried in stock and can be shipped promptly.

Check the features of this unit and see if they meet your ideas of what a marine steam-engine generator set should have.

For complete information about these sets, or about any electric equipment, address the nearest G-E office, or General Electric, Schenectady, New York.

FEATURES

Forced-oil Lubrication

The main bearings, crank pin, wrist pin, governor bearing, eccentric, and guides on the engine are lubricated by oil under pressure. After passing through the bearings, the oil returns to the reservoir to be used again. This feature gives quiet operation, minimizes attention, lessens wear, and reduces the quantity of oil required.

Raised Cylinder Improves Lubrication

The piston rod passes through a stuffing box in the top of the enclosing column. The cylinder is raised high enough so that no part of the piston rod entering the column stuffing box also enters the cylinder stuffing box. This prevents oil from creeping along the rod to the steam spaces, and keeps condensate from getting into the column and emulsifying the oil.

Governor Is Totally Enclosed

The automatic governor, on 30-kw. and smaller sets, is totally enclosed by the column. The valve eccentric is in direct alignment with the piston valve, and a simple, direct valve motion is used without any offsets or rocker-arm intermediary.

Highest Possible Efficiency

Short, direct passages between the cylinder and the valve-chamber ports, accurate fitting of all valves, crosshead guides, and bearings — these are some features of this engine which make for the highest possible efficiency.

Generator

The generator, of rolled-steel frame construction, represents the latest development and the most advanced design yet offered in this class of apparatus.

NRA MEMBER U.S. WE DO OUR PART

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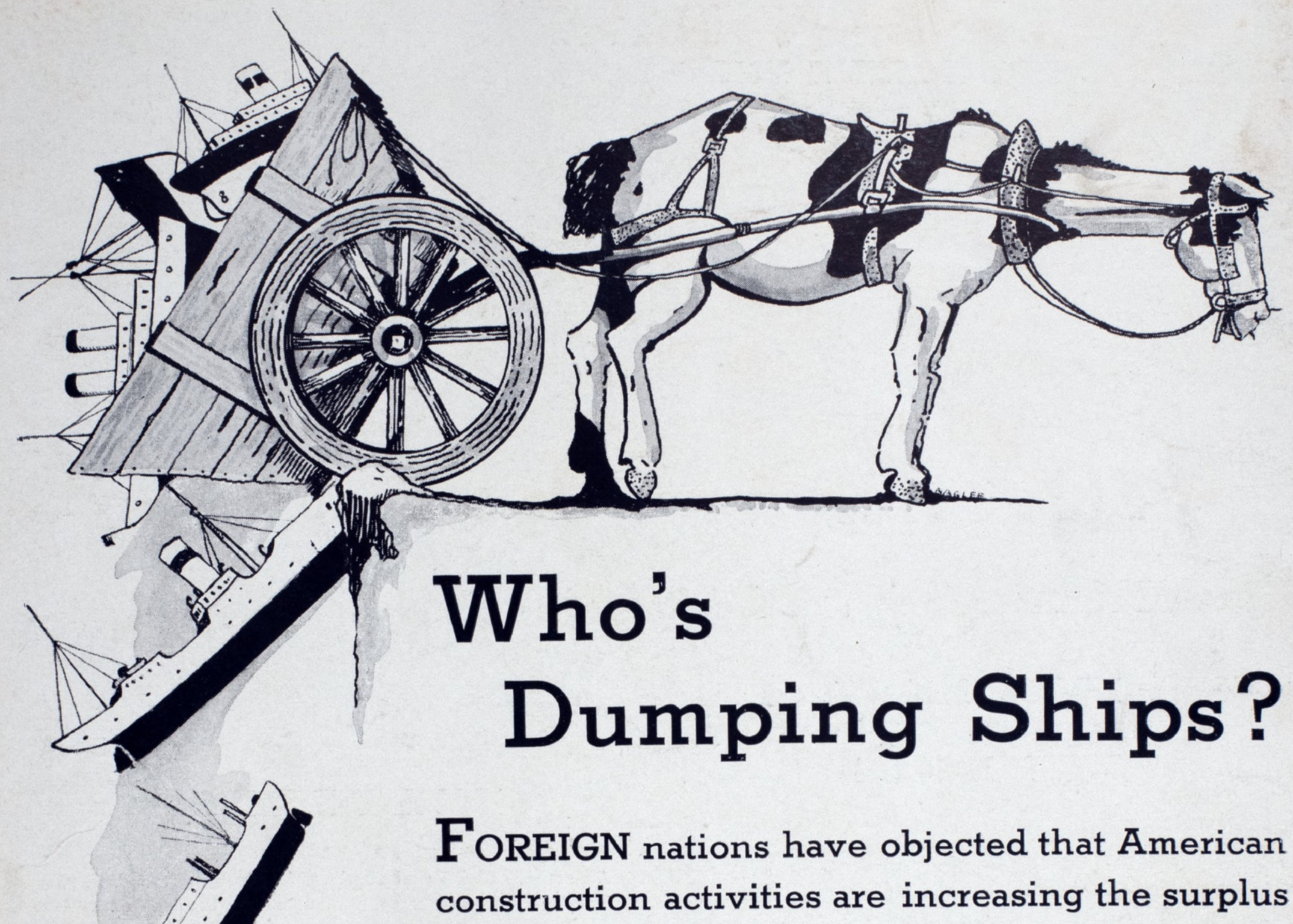
GENERAL ELECTRIC



Who's Dumping Ships?

FOREIGN nations have objected that American construction activities are increasing the surplus shipping tonnage of the world. They have assumed an air of indignation over the question and threatened to do something about it at the World Economic Conference.

As a matter of fact America's shipbuilding program in comparison to that of other maritime nations has been an unusually modest one. Since 1922 England alone outranked us in ship construction fourteen to one in number and ten to one in tonnage. There would be no surplus ships today if our competitors were as artless as they expect America to be.